# Request for Proposal Specifications 700/800MHz Project-25 Radio Network

KENTUCKY

Georgetown

SCOTT ★ COUNTY

January 11, 2018

## 1.0 GENERAL RESPONSE PROVISIONS

### 1.1 Purpose

The City of Georgetown and Scott County, Kentucky (City/County) covers some 285 square miles with a population of 52,420 and population density of 116 persons per square mile. The largest city and county seat is the City of Georgetown. Scott County is considered part of the City of Lexington and Fayette County, Kentucky Metropolitan area.

This Specification encompasses a turnkey project to provide the City/County with a new Project-25 700/800 MHz digital simulcast trunked radio network capable of meeting current and future communication needs, both reliably and functionally. The City/County is currently utilizing both trunked and Digital Mobile Radio (Nexedge). The current radio network is comprised of a three-site 800MHz EDACS multisite trunked radio configuration serving City Police, County Sheriff, and EMS, in conjunction with a two site VHF Nexedge system for the County Fire Department and a two site VHF Nexedge system for the City Fire Department.

A key desire of the City/County is to transition away from proprietary solutions and limited coverage with an effort to embrace new, emerging radio technology that is in full compliance with Industry-recognized Project-25 open standards and is compatible with other current or future P25 networks within the State of Kentucky. A second, critically important aspect of this communications network procurement involves coverage, redundancy, infrastructure reliability and hardening in response to heightened terrorism activities, worldwide, and to regional natural and environmental hazards such as earthquakes, tornadoes, ice storms, etc.

This Request for Proposal (RFP) Specification defines key functional and technical aspects of a standards-based enhanced digital radio communications network, aligned toward full Project-25 compliance within a

fixed period. Public Safety agencies (Police/Sheriff, Fire and EMS) within the following jurisdictions will immediately utilize this new digital radio network:

- Georgetown/Scott County 911 Center
- Scott County Sheriff's Office
- Georgetown Fire Department
- Scott County Fire Department
- Georgetown/Scott County Emergency Management
- Stamping Ground Police Department
- Georgetown/Scott County Emergency Medical Services
- Scott County Road Department
- Georgetown Police Department
- Georgetown Public Works
- Scott County Detention Center

It is required that interoperability with adjacent counties and the State of Kentucky must be encompassed within the proposed network solution.

The City/County recognizes that the most important aspect of any public safety radio network is coverage reliability coupled with clearly understood audio quality delivered to users throughout their various working environments. The City/County appreciates the need for Proposers to have adequate flexibility in these Specifications such that proposed solutions can be technically optimized to meet user desires and coverage expectations. Accordingly, this RFP Specification does not define a specific 700/800 MHz antenna configuration or minimum number of tower sites to achieve the desired coverage performance. The Specification does indicate where tower sites can potentially be made available if those site locations are appropriate in the Proposer's discretion to achieve the required coverage and reliability objectives. That is, these Specifications are designed to functionally describe user expectations, reliability and the City/County desire for EIA/TIA Project-25 infrastructure and user equipment compliance.

Interoperability between the City/County first responders and other adjacent municipal, county, and state jurisdictions is another area of concern that is

addressed by these Specifications. The City/County must be able to communicate with those agencies they interoperate with today. Proposals shall include solutions that allow City/County agencies to continue to interoperate. In any case, radio solutions described in response to this Request for Proposal Specification must be compatible and interoperable with these existing infrastructures via mirrored switch technology or a scheme fully compatible with APCO P25 interoperable switch interface standards (ISSI).

The City/County is also aware that the voluntary development and user adoption of APCO Project-25 open-standards has been a laboriously slow one. APCO Project-25 standards develop commenced over twenty-five years ago, and has only within the more recent past achieved ratification of switch interconnectivity standards for networks. It is recognized that final development of narrowband Project-25 Phase-2 6.25 KHz specifications has been completed and its essential framework/technology is available from multiple vendors. To support both Phase 1 12.5KHz and Phase 2 6.25KHz P25 formats, vendor solutions/equipment offered in response to this RFP must be operable on both Project-25 Phase 1 and Phase 2 protocols.

Following the federal government's lead, it is perceived that significant and tangible improvements to local-area 800MHz operations as well as wide area interoperability can be achieved, minimally, through the application of Project-25 technologies. This Specification describes those functional, operational, and to a limited extent, technical requirements/objectives for the City/County envisioned new Project-25 digital radio communications network.

## 1.2 Instructions

This RFP Specification is a complete document and must be returned intact with proposal responses provided in a point-by-point fashion. The RFP Authorization Form in Section 16 must be completed. All responses and

attachments should be placed into the RFP Response immediately behind the area in which the information was requested i.e., or a point-by-point response.

If supplementary materials are inserted, each inserted page must be labeled in the bottom margin with the number of the Specification page behind which it is being placed. If more than one page is inserted behind a RFP Specification page, then each must be labeled with the appropriate page number plus a letter designator, e.g. 121a, 121b, 121c, etc.

When submitting bids or responses to RFPs, corporate entities are required to comply with State law regarding authorized signatures. A letter of proposal submittal is required. If some official with the proposing corporation other than its president executes the letter of transmittal such signature must be accompanied by a certificate or a copy of a resolution adopted by the corporation setting forth the authority of that individual to execute a contract.

As set forth above when submitting bids and RFPs, certification adhering to the state statutes should accompany documents being turned in for review.

- Appendix A is also provided with this RFP to provide additional detailed instructions on procurement compliance with the City of Georgetown.
- The City of Georgetown will be acting on behalf of both the City of Georgetown and Scott County. The relevant parties to be bound will be reflected in a future contract."

### *1.2.1 Proposal Timeline*

| **PROPOSAL TIMELINE** | |
|---|---|
| Release of Requests for Proposal | Thursday, January 11, 2018 |
| Mandatory Pre-Proposal Conference/Site Visits (1 day) | Tuesday, February 13, 2018 |
| Deadline for Submission of Questions NLT 4:00PM EST | Tuesday February 20, 2018 |
| Answers Provided Through Addendum No Later Than 4:00 PM EST | Tuesday February 27, 2018 |
| Proposal Due Date and Time 4:00 PM EST | Wednesday March 14, 2018 |

### *1.2.2 Pre-RFP Conferences*

This RFP constitutes the full scope of the information request. An RFP mandatory proposal conference will be conducted approximately three weeks after release of these Specifications to the Public The time and place of the pre-proposal conference will be at, Georgetown Police Department, Community Room, 550 Bourbon St., Georgetown, KY. 40324, **on Wednesday February 13, 2018 at 0900 hours.**

### *1.2.3 RFP Questions*

If during the review or preparation of the RFP response submittal, a Proposer discovers any errors, omissions or ambiguities, they should submit, in writing, their questions to the City/County. Written questions should be received by the City/County at designated by the RFP schedule. Questions submitted at least 72 hours in advance of the Pre-Proposal Conference will be addressed during the Conference.

### *1.2.4 Late RFP Response Submission*

Any RFP Response submitted after the specified submission due date and time, will not be accepted and will be returned unopened to the submitting organization. All RFP responses will be held in confidence, to the extent permissible by State and City/County law, as applicable.

### *1.2.5 RFP Response Submittal*

The Proposal Response shall be divided into two sections: 1) Technical and 2) Infrastructure Pricing and User Equipment Pricing. One (1) copy each of

the Technical Response and One (1) electronic searchable copy of the Technical Response and one (1) copy each of the Infrastructure and User Equipment Pricing Response and One (1) electronic searchable copy Pricing Response are to be submitted.

The Pricing Responses shall be separated from the Technical Response and independently sealed.

Each Proposal Response shall be submitted in standard 8 1/2" x 11" three ring binder. The entire Response package must be submitted in a sealed container addressed to:

Tracie Hoffman
City Clerk/Treasurer
100 North Court St.
Georgetown, KY. 40324
tracie.hoffman@georgetownky.gov

RFP Titled: Georgetown/Scott County, Kentucky 700/800MHz Project-25 Radio Network and identifying the title and RFP Number of the procurement. The time and date of the Proposal Opening must be plainly marked on the container as well as the Proposer's name, address and State Contractor's License Number. All Proposal Responses should be delivered by hand, with receipt requested, or by certified or registered mail. All Proposal Responses become property of Georgetown/Scott County, Kentucky. A cover letter transmitting the Proposal Response must accompany the package.

*1.2.5.1 Proposal Evaluation and Selection by Consultant*

Technical and Pricing Proposals shall be evaluated separately using a weighted point system whereby out of a maximum 100% Overall Project Score, 75% shall be allocated to Technical Proposal evaluation scores with 25% being allocated and equally shared between Infrastructure and Subscriber Equipment Price Proposals.

Technical Proposals will first be evaluated for overall responsiveness and completeness to the RFP Specifications. Proposals that are determined responsive and complete will be evaluated by the Consultant.

Technical Proposals will be graded in the following areas, listed in relative order of importance, with respect to the requirements as outlined in this RFP:

1. Performance, compatibility, expansion capabilities and versatility (32%)
2. Reliability, redundancy and warranty (20%)
3. Proposer qualifications, history of product support and RFP deviations (10%)
4. Equipment repair, installation, and implementation (10%)
5. Interoperability (10%)
6. Training (7%)
7. Maintenance and time limit of availability of service parts (6%)
8. Organization, scope and detail of proposal (5%)

The scored results of this Technical Evaluation will be multiplied by 0.75, thereby yielding a weighted technical project-total score. The results of this portion of the Evaluation shall be submitted to the City/County.

At the direction of the City/County as to the suitability and acceptability of the Technical Evaluation Results, the Consultant will next open and evaluate proposed costs for each responsive Technical Proposal.

The relative cost differences between responsive Cost Proposals shall be compared and evaluated using a process determined by the City/County.

Each of the Infrastructure and Subscriber Equipment Cost Proposals received from responsive Proposers shall have their individual evaluation raw scores multiplied by 0.25 and those two results added together and with the Technical Evaluation score, thus yielding an Overall Project Score for each Proposer's Submittal.

That Proposer Submittal receiving the highest Overall Project Score shall be recommended by the Consultant as being the most responsive, best proposal. In the case of a tied Overall Project Score, the Consultant shall recommend that Proposal Submittal having the highest Technical Proposal evaluation score.

*1.2.5.2 Total Costs*

The City/County reserves the right to evaluate total project price based on initial cost and life cycle analyses. Any deviations by Proposers from the pricing requirements herein shall be approved in advance of Proposal Submittal or they will be construed as being non-conforming and the Proposal Submittal will not be given further consideration.

## 1.3 Definitions

Definitions as used herein:

(a) Responder, Proposer:
Any organization, company, vendor, or supplier responding to this RFP Specification.

(b) Contractor:
The Proposer to whom a Contract is awarded.

(c) Proposal, RFP Response, Submittal:
Correspondence or material furnished by Responders in response to this specification.

(d) (Georgetown/Scott County, Kentucky):
Network Owner- City/County:
City of Georgetown
100 N Court St., Georgetown, KY. 40324

(e) Consultant
Tusa Consulting Services 2, LLC,
Dean Hart, 7332 N Palmer, Kanas City, MO. 64158
Tele: (816) 518-9223
dean.hart@tusaconsulting.com

## 1.4 RFP Proposer Standards

The Proposer must have manufactured, delivered and installed at least three radio systems of comparable technology (700/800MHz Project-25 digital voice simulcast transmit/receiver voted), having comparable size and scope. These three systems shall be described with enough information that the City/County or its Consultant can reasonably determine their project equivalency. These submittals should include a detailed summary of the system and its significant operational features/components as well as a current customer contact including name, address, and phone number, title, department and system responsibility.

RFP Responders will likewise be required to provide sufficient information necessary to support claims that both proposed infrastructures and user equipment will be functionally and operationally compatible with 700MHz channels (764-767MHz and 773-776MHz, paired with 794-797MHz and 803-806MHz, respectively) as well as the newly configured 800MHz NPSPAC

channel plan because of FCC-Ordered 800MHz Rebanding. Failure to propose equipment capable of operations on this new spectrum and/or unable to support Project-25 Phase 1 and Phase 2 operations shall be considered non-responsive and that vendor's RFP submittal shall be given no further consideration.

A factory authorized service center that is fully staffed and trained to support the proposed infrastructure network, and all related subsystem equipment, must be located within a 60 minute (1hour) response time of Georgetown, Kentucky to be considered adequate to satisfy initial installation, implementation, optimization, warranty and ongoing maintenance needs. The Contractor and all envisioned subcontractors, if any, must be able to legally conduct business within the State of Kentucky.

The following standards shall apply, as a minimum, to all equipment, installation methods and materials:

A. EIA/TIA–Electronic/Telecommunications Association
B. NEC - National Electric Code
C. NEMA - National Electrical Manufacturer's Association
D. IEEE - Institute of Electrical and Electronic Engineers, Inc.
E. FCC - Federal Communications Commission
F. FAA – Federal Aviation Administration
G. NFPA – National Fire Prevention Association
H. Building Codes for Scott County, Kentucky
I. OSHA - Occupational Safety and Health Administration

## 1.5 Workmanship

The Contractor agrees that the Consultant and appropriate City/County personnel will be permitted to observe user equipment installation, network implementation and all optimization/testing phases.

All workmanship must conform to normal and accepted standards for the telecommunications industry and will be thoroughly examined by City/County Representatives and its Consultant at various stages during project implementation and before final acceptance. All fixed site equipment, including electronic communications infrastructure, dispatch consoles; alarm system consoles, network management consoles, electrical wiring, towers, antennas, mounts, etc., must be installed by or under the supervision of the Contractor.

The Contractor must completely remove and properly dispose of residue due to its work, return the site to a useable state and will be responsible for the cost of repairing all damage caused by the Contractor or its Sub-Contractors during network installation.

The City/County and its Consultant reserve the right to halt the installation process due to poor workmanship, housekeeping, scheduling, work interruptions, etc. Work halts that have resulted from poor workmanship or unsafe or unacceptable conditions shall not relieve the Contractor of their responsibility to conform to the installation time requirements as stated in this Specification.

## 1.6 Materials

All equipment, except with the expressed written permission of the City/County and its Consultant, must be new and unused, meet telecommunications industry standards, and, where applicable**, be registered with and approved by the Federal Communications Commission**. The City/County or its Consultant would reserve the right to reject and require the return, at the Contractor's expense, all components which are defective or fail to comply with this RFP Specification or lack FCC type approval. Such rejections and/or returns will neither validate nor invalidate the remainder of

any Contract. Rejections of material for cause would not provide an extension of time to the Contractor in the performance of contracted requirements.

## 1.7 Sub-Contractors

It is required that a single Contractor have total responsibility for the project to assure a fully operational and expanded P25 configuration. The City/County will require documentation and references, including a thorough background investigation, to ensure the qualification of a Sub-Contractor if any are employed by the Vendor/Contractor. Any Sub-Contractor or person that is determined by City/County to be unqualified or unacceptable to perform their duties may, at the City/County's sole discretion, be barred from working on the project. The Sub-Contractor(s) cannot be changed after submission of the Submittal Response except with the written permission of (Client). Changes in Sub-Contractors shall not provide an extension of time to the Contract term.

## 1.8 Premises Visits

Responders, before submitting a RFP Response, may desire to visit existing City/County radio infrastructure site premises to gain familiarity with conditions which may affect the work or planned solution(s). The City/County, its designated local representative or the Consultant will coordinate access and escort to the various sites. If more than one visit to a site is requested and time allows, the City/County will support the necessary arrangements.

RFP Responders must indicate any special requirements, i.e., architectural, mechanical, electrical, civil or structural modifications, that their equipment may need at either City/County-owned or non-City/County-owned locations that are intended to be utilized in the offered solutions.

Estimated costs for these special requirements shall be disclosed in the RFP Submittal.

## 1.9 Contact

All contact and inquiry concerning this RFP Specification shall be directed to:

Tracie Hoffman
City Clerk/Treasurer
100 North Court St.
Georgetown, KY. 40324
tracie.hoffman@georgetownky.gov

## 1.10 Notification

Responders will be notified of the City/County's desire to enter additional discussions as well as an oral presentation of proposed solutions, if determined necessary. The City/County's ranking of proposals shall be published after a recommendation of the best and most advantageous proposal is presented to City/County's Chief Administrative Officer/Manager or other recognized body.

## 1.11 Installation

### *1.11.1 Project Time Frame for Completion*

The Project's anticipated time frame for completion is no greater than (12) months from a formal Notice to Proceed. The Project will not be deemed completed until a *fully-compliant* Project-25 simulcast infrastructure has been installed; all network functionality, audio quality and mandatory coverage testing has satisfactorily been completed in accordance with the Contract's Acceptance Test Plan; receipt of as-built documentation has occurred; and a Certificate of Substantial Completion has been issued by the Consultant for any remaining punch list items.

So-called vendor “Standard Contracts” will not be acceptable unless suitably modified and brought into compliance with this RFP and/or subsequent RFP Specifications.

## 1.12 Training

The City/County considers training to be of paramount importance. Administrative and dispatcher training shall be completed on-site by the Contractor's personnel. Dispatcher training shall be more extensive and will involve all designated regular and relief dispatchers employed by the City/County at the time of system operational testing. The Contractor shall provide administrative training for two Communication Network Managers. Software training shall be provided which will enable these personnel to perform functionality/feature changes to fixed site equipment and portables/mobiles, poll the network diagnostics perform traffic and feature usage studies, etc. It is the desire of the City/County that such training is to commence within 60 days upon completion of contract negotiations and execution, and be completed prior to the Customer Design Review (CDR) meeting or a suitable time as desired by the City/County.

Additionally, the Contractor shall develop and train radio system dispatchers in the proper operation of radio console and backup control station equipment, as is necessary to operate the new P25 trunked radio system. The Contractor shall coordinate all training sessions with the City/County. All training must be approved by the City/County. Dispatch, maintenance personnel and network manager follow-up training shall be provided and scheduled no more than sixty (60) days after project completion for the purpose of training reinforcement. All training costs, direct or indirect, such as meeting rooms, instructor travel, lodging and transportation, must be included in the final proposed price.

As an option, the Contractor must provide comprehensive maintenance training for one person, whereby the City/County service/support personnel are qualified in the proper diagnostic, maintenance and repair service skills needed to quickly resolve 700/800MHz communications equipment malfunctions as well as microwave backhaul operational problems.

The Contractor is required to provide operational and full maintenance training for all service/support personnel, either on site or at remote factory locations. This level of training will be essentially equivalent to the level of service training required by the Contractor for its employed maintenance providers. Additionally, the Contractor must develop and train service/support personnel in those aspects of maintenance necessary to ensure the highest availability and reliability of infrastructure and subscriber equipment resources. Preventative maintenance training should encompass all elements of proposed infrastructure equipment, inclusive of base stations, trunking controllers, network switches, microwave backhaul, standby generator equipment, battery plants, battery charging systems, tower light systems, site grounding systems, alarm systems and all other subsystems directly or indirectly related to infrastructure reliability and operations.

This maintenance option should also include a full complement of test equipment to provide the services as required by the maintenance training.

## 1.13 Parallel Implementation

In development of RFP submittals, Responders must consider that the new radio network must be installed in a parallel implementation. The current systems are the City/County's only Public Safety Voice communications systems and must operate 24/7/365. No interruptions in service of any duration may be allowed without prior approval of the City/County or their designee. Therefore, fully duplicated voice radio systems will coexist for some period.

The period of parallel installation will be used to perform testing of operational functionality of the entire network, dispatch consoles, mobiles, portables, network features, and high capacity receiver-voting and simulcast transmitter operations.

Since existing dispatch console equipment will control the old system during the parallel phase, the Contractor would be responsible for developing a plan to accommodate both existing and proposed equipment during the parallel and transitional periods of installation and implementation.

## 1.14 Manufacturer Support

The City/County requires a one-year comprehensive warranty on all infrastructure equipment required by the new P25 radio network. No less than a two-year warranty is acceptable for user radio equipment. These warranty periods will not begin until complete system acceptance has been successfully achieved by the Contractor.

## 1.15 Parts Availability

All proposed backbone infrastructure components, inclusive of microwave equipment and repair parts shall be available for at least fifteen (15) years from the date of system acceptance. End user equipment (i.e. portables, mobile, etc.) repair parts shall be available for at least five (5) years from the date of cessation of equipment manufacturer.

## 1.16 Warranty of Network Performance

In submitting their RFP Response, the Proposer acknowledges that it has carefully reviewed the functional requirements and warrants that the proposed P25 radio network solutions shall function in compliance with equipment specifications, industry standards and the minimum operative characteristics specified in Sections 4.0, 5.0 and 7.0 of this Specification.

## 1.17 Remedies

Remedies shall be part of any Contract awarded and negotiated with the Successful Proposer. The scope of these remedies will become part of a negotiated contract and shall minimally include a graduated set of monetary penalties for unexcused late or delayed performance by the Contractor. The project schedule's indicated completion date shall be the basis for assessment of completion remedies.

Remedies shall be applied as follows:

Unexcused project completion delays of between 1 day and 30 days beyond the Contract's indicated completion date shall be assessed a penalty of $1,000 per day. Unexcused completion delays that extend from Day 31 through Day 70 beyond the Contract's indicated completion shall be assessed a penalty of $1,500 per day. Unexcused completion delays beyond 70 days shall be assessed a remedy of $2,000 per day.

Any unexcused project completion delay that exceeds 180 days from the Contract's indicated completion date shall trigger an automatic default of the Contract. If the Contractor is unable to cure the reason for its completion failure within 45 additional days, the Contract will self-cancel and the Owner will initiate action against the Contractor's performance bond unless some acceptable accommodation is reached by the Contractor with the Owner. During the 45-day default period, remedies will be assessed at the rate of $3,000 per day.

Remedies shall also apply to warranty repair service and extended warranty services negotiated and purchased by the Owner. The RFP and its subsequent contract with the Successful Proposer/Contractor include a mandatory warranty period where repair services performed in the field will be necessary. These Specifications contain response time periods within which the Contractor is required provide services and materials. A failure to perform on the part of the Contractor to meet its contracted response time requirements shall result in a financial penalty of the scope and amount indicated by these Specifications or as modified during contract negotiations.

## 1.18 Contracts

This Specification and the Vendor's Response will be an integral part of the Contract. **All statements made in the Vendor's Response and/or by requested clarifications will automatically become part of the final Contract for equipment and services unless rejected by the City/County.**

Omission in the Response Submittal of any equipment, services or provisions herein prescribed shall not be construed to relieve the Contractor of any responsibility or obligation necessary to the complete and satisfactory installation of all systems, equipment, and services specified. The network price and any optional prices quoted must include all equipment, service, features, materials, labor, etc. necessary to make all the features, services, and equipment, which are included, fully functional. The Vendor agrees that the cost of additional equipment, materials, or labor necessary to meet these requirements, which was not otherwise calculated in his Response Submittal, shall be solely at the Contractor's expense.

Each Response Submittal must be signed by a duly authorized officer who is empowered to contractually bind the Vendor.

## 1.19 Non-Appropriation of Funds

In the event no funds or insufficient funds are appropriated and budgeted by the City/County or are otherwise unavailable for fulfilling the requirements of the Contract, the obligations of Client shall terminate on the last day of the fiscal period for which appropriations are received, without penalty or expense to the City/County of any kind whatsoever. Client will immediately notify the Contractor or its assignee of such occurrence. In the event of such termination, the City/County agrees to peaceably surrender possession of the equipment to the Contractor or its assignee on the date of such termination to the extent that such equipment has not been paid for by the City/County. The Contractor will be responsible for packing all equipment and any freight charges.

Client is committed only to the procurement of the modernized P25 radio system infrastructure, inclusive of radio dispatcher equipment.

Client will not cancel if any funds are appropriated to it, or by it, for the acquisition, retention or operation of the equipment or other equipment performing similar functions for the current fiscal period in which the termination occurs or the next succeeding fiscal period thereafter and that it will not, during the funding period, give priority to other functionally similar equipment or services.

The Contractor shall covenant and agree to indemnify and hold City/County harmless against any loss, damage liability, cost, penalty or expense, including attorney's fees, which it is not otherwise agreed to by the City/County in the equipment Contract and which is incurred and arises upon a failure of the City/County to appropriate funds in the manner described herein for a continuation of the Contract or exercise of the option to purchase the equipment.

## 1.20 Acceptance Testing Processes

Acceptance testing procedures will be defined during downstream Contract Negotiations. These procedures would essentially test and verify the performance of hardware/software features; coverage performance; reliability and interoperability with the City/County conventional sites and neighboring jurisdictions.

The Acceptance Test shall minimally encompass:

1. A Factory Staging Verification of network functionality to include the P25 radio network and supporting microwave backhaul network;
2. An installed determination of compliance with Industry standards and published specifications of the various equipment elements provided under the Contract;
3. Functionality of standby power systems
4. Functionality and path reliability of microwave link segments and the network;
5. A successful completion of a set of voice quality and signal level coverage tests of sufficient scope to confirm that the outdoor, in-vehicle and in-building coverage required by the Contract has been achieved.
6. Completion of a mandatory 30-day reliability burn in absent of any major network failures (i.e., loss of tower site, loss of 30% of network capacity, unreliable m/w functionality, etc.)

## 1.21 Right of Refusal

The City/County reserves the right to reject any or all RFP Responses received. Acceptance of any Response will not place the City/County under any obligation to purchase any equipment, system or services.

## 1.22 Performance and Payment Bonds

A Performance Bond in the amount of one hundred percent (100%) of the Contract Price shall be provided by the Contractor in the event a contract is subsequently awarded through either a sole-source or competitive procurement process. The Performance Bond shall be exercised by the City/County for failure of the Contractor to perform per the terms of the Contract, i.e., an uncured default condition that results in Contract Cancellation.

A Payment Bond in the amount of one hundred percent (100%) of the Contract price would likewise be required. The Payment Bond must be from a surety company authorized to do business in the State of Kentucky with a rating of A- or better in the most current edition of the A.M. Best Insurance Report.

The cost of these Performance and Payment Bonds shall be the responsibility of the Contractor.

## 1.23 Proposal Pricing Summary Sheets

Responders shall provide detailed price breakdown submittals for infrastructure and subscriber equipment items, network integration/project management and installation/engineering services. It is not acceptable to lump category costs. Proposers must provide sufficient detail in their pricing proposals whereby it is possible to identify equipment types and services groupings. The format of the price submittal shall follow that as indicated by RFP Section 16.

## 1.24 Corporate Resolution

RFP Response submittals must contain a Corporate Resolution or Power of Attorney authorizing and identifying agents to sign their Proposal or other documents as required by this Specification. This Corporate Resolution or Power of Attorney must be certified and notarized.

## 1.25 Non-Collusion Affidavit

Proposers must complete and submit the following Non-Collusion Affidavit form. Attach an executed original in the Original-Marked proposal submittal and a copy of this executed form in all subsequent proposal copies, as required.

## NON-COLLUSION AFFIDAVIT

STATE OF_____

CITY/COUNTY OF_____

_____, being first duly sworn, deposes and says that:

(1) Executor is (Owner) (Partner) (Officer) (Representative) or (Agent), of _____, the Proposer that has submitted the attached Proposal Response;

(2) Such Proposal Response is genuine and is not a collusive or sham Proposal;

(3) Neither the said Proposer nor any of its officers, partners, owners, agents, representatives, employees or parties of interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly, or indirectly with any other Proposer, firm or person to submit a collusive or sham Proposal in connection with the Contract for which the attached Proposal Response has been submitted or to refrain from proposing in connection with such Contract, or has in any manner, directly or indirectly sought by agreement or collusion or communication or conference with any other Proposer, or to fix any overhead, profit or cost element of the Proposer price or the Proposer price of any other proposer, or to secure through any advantage against the City of Georgetown, Kentucky or any person interested in the proposed Contract; and

(4) The price or prices quoted in the attached Proposal Response are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Proposer or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

_____

Subscribed and sworn to, this _____ day of _____, 201____.

## 1.26 Brokerage Fee

The Contractor warrants that he has not employed any person to solicit or secure this Contract upon an agreement for a commission, percentage, brokerage or contingent fee. Breach of this warranty shall give the City/County the right to terminate the Contract, or, at the discretion of the City/County, to deduct from the Contract price or consideration, the amount of such commission, percentage, brokerage or contingent fee. This warranty shall not apply to commissions payable by contractors upon contracts or established commercial or selling agencies maintained by the Contractor for securing business. No elected official or employee of the City/County shall be permitted to share any part of this Contract or any benefit that may arise wherefrom, and any contract made by the City/County in which such individual(s) shall be personally interested shall be void, and no payments shall be made thereon by the City/County or any officers thereof.

## 1.27 Conflict of Interest

In the interest of ensuring that efforts of the Contractor do not conflict with the interests of the City/County, and in recognition of the Contractor's professional responsibility to the City/County, the Contractor agrees to decline any offer of employment if its independent professional work on behalf of the City/County is likely to be adversely affected by the acceptance of such employment. The initial determination of such a possibility rests with the Contractor. It is incumbent upon the Contractor to notify the City/County and provide full disclosure of the possible effects of such employment on the Contractor's independent, professional work on behalf of the City/County. Final decision on any disputed offers of other employment for the Contractor shall rest with the City/County.

## 1.28 Contracts

This Specification and the Successful Proposer's Response will be an integral part of the Contract. Statements made in the Proposal Response will automatically become part of the final Contract for equipment and services. Inability to contractually guarantee any statement made in their Proposal Response will result in Proposer disqualification.

Omission in the Proposal Response of any equipment, services or provisions herein prescribed shall not be construed to relieve the Contractor of any responsibility or obligation necessary to the complete and satisfactory installation of any or all systems, equipment, and services specified. The network price and any optional prices quoted must include all equipment, service, features, materials, labor, etc. necessary to make all the features, services, and equipment, which are included, fully functional. The Proposer agrees that the cost of additional equipment, materials, or labor necessary to meet these requirements, which was not otherwise calculated in his Proposal Response, shall be solely at the Contractor's expense.

If there are specific items that are purposefully excluded in the Proposer's indicated price, those must be defined by the Proposer's submittal. If, however, those Proposer-excluded items are what the City/County and its Consultant consider to be normal and customary for a project of this type, any proposal response excluding such items will be graded as not meeting minimum requirements for the appropriate Specification category(s) that are impacted by that exclusion.

Each Proposal Response must be signed by a duly authorized officer who is empowered to contractually bind the Proposer.

The City/County shall enter negotiations with the apparent responsive and best Proposer. Should the City/County be unable to negotiate a Contract with the apparent responsive and best Proposer, the City/County will exercise its

right to enter negotiations with that Proposer having the next-highest evaluation score.

## 1.29 Purchase Payment Schedule

The following payment schedule shall apply:

10% - at Contract execution

25% - at delivery of and inventory by the City/County designee of network infrastructure components to the City/County designated location(s)

15% -upon infrastructure installation completion

25% -upon satisfactory completion of audio quality and range coverage testing

15% -upon issuance of subscriber equipment and satisfactory completion of all training

10% - upon Final Network Acceptance.

The Proposer agrees that all prices quoted in its Proposal Response are valid for one year from the Contract execution date. Future price discounts are valid for the time periods indicated in Section 16.

## 1.30 Contractor's Insurance

The Contractor shall be responsible for loss of material connected with the construction due to unexplained disappearance, theft or misappropriation of any kind or nature. The foregoing provisions shall not operate to relieve the

Contractor and any Subcontractors of responsibility for loss or damage to their own or rented property or property of their employees of whatever kind or nature, including but not limited to tools, equipment, forms, scaffolding and temporary structures including their contents.

The City/County shall in no event be liable for any loss or damage to any of the items or any other property of Contractor and any Subcontractors, which is not included in the permanent construction. The Contractor and any Subcontractors hereby waive any right of recovery they may have against the City/County for damage or destruction of property of whatever kind or nature whether it is their own property or property of their employees.

The Contractor shall procure and maintain for the duration of the Contract the following insurance policies as mandated by and with minimum limits set by the City/County's Procurement Policy with coverage for occurrences and claims that may arise from or about the performance of the obligations hereunder by the Contractor, its agents, employees, representatives and subcontractors:

1. A policy or policies to insure the Contractor for legal liability because personal injury (including death resulting wherefrom) or loss of or damage to property however arising in the execution of this Contract and specifically including explosion, collapse, and underground damage. The combined liability limits shall not be less than $2,000,000. This insurance shall include coverage for (a) Premises - Operations; (b) Broad Form Contractual Liability; (c) Products and Completed Operations; (d) Use of Contractors and Subcontractors; (e) Personal Injury; (f) Broad Form Property Damage. "Claims made" form shall not be acceptable. The "occurrence form" shall not have a "sunset clause".

2. The policy or policies for this combined liability shall also include products/completed operations liability for one year after completion of the work and acceptance by the City/County.

3. A policy to cover the full liability of the Contractor in accordance with the provisions of the Worker's Compensation Law of the State of Kansas. The Contractor shall also maintain employer's liability coverage with limits of not less than $2,000,000 per year. The Contractor shall also obtain from its Workers' Compensation Insurance carrier a waiver of subrogation in favor of the City/County.

4. The Contractor will provide evidence of automobiles liability coverage for owned, non-owned and/or hired vehicles in limits not less than $2,000,000 combined single limit per occurrence for bodily injury and property damage.

The policies or certificates evidencing the coverage provided above shall be submitted at a Pre-Construction Conference prior to commencing any work or City/County issuance of a formal Notice to Proceed. Such policies or certificates shall provide that insurance will not be materially altered or cancelled without thirty (30) days prior written notice to the City/County.

*1.30.1 Other Provisions*

The insurance policies required by the Contract shall contain, or be endorsed to contain, the following provisions:

1. The City/County, its officers, agents, servants, and employees, shall be added as "additional insureds" under the Comprehensive General Liability and Automobile Liability Coverages.

2. The Workers' Compensation and Employer's Liability coverages shall contain an express waiver of all rights of subrogation against the City/County, its officers, agents, servants, and employees, for losses arising from work performed by the Contractor for the City/County.

3. All insurance policies required by this Contract shall be endorsed to state that coverage shall not be suspended, voided, cancelled by either party, or reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail has been given to the City/County.

*1.30.2 Acceptability of Insurers*

All insurance required by this Section shall be placed with insurers that are authorized to do business in the State of Kansas and have a rating of no less than A- in the most current edition of the A.M. Best Insurance Report. Insurers shall have a minimum financial size category of V2I, per A.M. Best.

*1.30.3 Certificates of Insurance*

The Contractor shall furnish to the City/County Certificates of Insurance affecting coverage required by this Contract. The certificates are to be signed by a state licensed agent authorized by that insurer to bind coverage on its behalf and endorsements. The certificates and endorsements must be received and approved by the City/County prior to the Contract's effective date.

## 1.31 Indemnity

Indemnity shall be negotiated with the apparent responsive and best Proposer as part of Contract negotiations.

## 2.0 EXISTING PUBLIC SAFETY RADIO SYSTEM

### 2.1 General

The City of Georgetown and Scott County, Kentucky operate a combined radio communications network consisting of EDACS 800MHz Multisite technology (three actual tower sites), a VHF Nexedge system (four actual sites), a City-managed Radio Dispatch and 911 Center, and a County-managed Emergency Management Center. The City's law enforcement dispatch center operates a Zetron dispatch console system. This dispatch configuration utilizes talkgroup and channel specific control stations for linkage to the EDACS 800MHz system and the VHF Nexedge system for the City and County.

The City/County's radio system supports a subscriber fleet of approximately 615 user radios. The City Police, County Sheriff, and EMS radios are operable on 800MHz EDACS channels. The City and County Fire radios are operable on VHF Nexedge radio channels.

The City Fire Department has some capabilities in the stations with a Zetron Fire Alerting solution. However, this system is not being used at this time.

The following information pertains to the City/County's existing radio sites:


## City / County EDACS Sites

Sadieville EDACS Site

- Self-Support Tower site ASR: 1043463
- Coordinates – Latitude: 38°22'20.0"N Longitude: 84°33'51.0"W
- Ground Elevation – 963 ft.
- 800MHz EDACS Multisite (FCC License – WPSV784)
  TX ERP 630W (Per License)
  Microwave Solecttek (4.9GHz licensed - WQIN419)

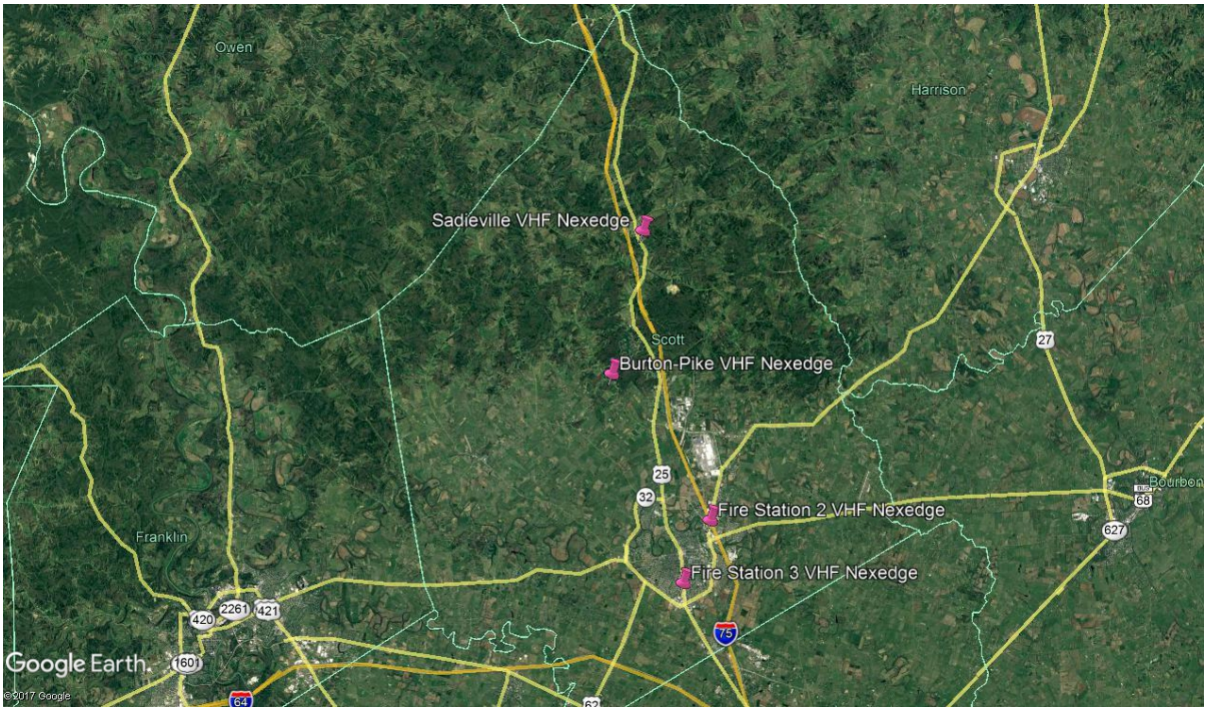
Lancaster Water Tower EDACS Site

- Water Tower site
- Coordinates – Latitude: 38°12'30.3"N Longitude: 84°34'52.0"W
- Ground Elevation – 886 ft.
- 800MHz EDACS Multisite/IMC (FCC License – WPSV784)
  TX ERP 630 (Per License)
  Microwave Solectek (4.9GHz licensed - WQIN419)

Stamping Ground Water Tower EDACS Site

- Water Tower Site
- Coordinates – Latitude: 38°16'16.1"N Longitude: 84°41'27.2”W
- Ground Elevation – 817 ft.
- 800MHz EDACS Multisite/IMC (FCC License – WPSV784)
  TX ERP 125W (Per License)
  Microwave Solectek (4.9GHz licensed – WQIN419)

## City / County VHF Nexedge Sites




Burton-Pike Nexedge Site
Guyed Tower site
Coordinates – Latitude: 38°18'07.3"N Longitude: 84°35'38.8"W
Ground Elevation – 1020 ft.
VHF Site (FCC License – WNUW612)
TX ERP 190W (Licensed)

Sadieville Nexedge Site
Self-Support Tower site ASR: 1043463
Coordinates – Latitude: 38°22'20.0"N Longitude: 84°33'51.0"W
Ground Elevation – 963 ft.
VHF Site (FCC License – WNU612)
TX ERP 190W (Licensed)

Fire Station 2 Nexedge Site
- Coordinates – Latitude: 38°11'18.6"N Longitude: 84°33'50.6"W
- Ground Elevation – 837 ft.
- VHF Site (FCC License – KNFP305)
  TX ERP 250W (Licensed)

Fire Station 3 Nexedge Site
- Coordinates – Latitude: 38°13'59.0"N Longitude: 97°46'32.2"W
- Ground Elevation – 1535 ft.
- VHF Site (FCC License – KNFP305)
  TX ERP 250W (Licensed)

### City / County Dispatch Center Site

911 Communications Center
- Monopole Tower site
- Coordinates – Latitude: 38°12'42.33"N Longitude: 84°33'12.72"W
- Ground Elevation – 854 ft.
- 800MHz EDACS/VHF Nexedge Site Control Stations

### County Emergency Management Site

Emergency Management Center
- SST Tower site
- Coordinates – Latitude: 38°16'48.31"N Longitude: 84°34'7.26"W
- Ground Elevation – 890 ft.
- 800MHz EDACS/VHF Nexedge Site Control Stations

## 3.0 IDENTIFIED USER NEEDS

### 3.1 General

The current radio network configuration has been built over a period of several years, lacks coverage in areas of the county and lacks reliable building coverage for portable radio units. The cost of new radio equipment requires proprietary protocols and adds expense to the purchase of new equipment.

A full description of the network's configuration is described by RFP Section 2. Proposers are strongly encouraged to thoroughly review that information and to conduct as many on-site inspections as necessary to gain a comprehensive understanding of existing-configuration performance and facilities available for reuse. It is critically important to the success of this digital enhancement project that Proposers have a clear understanding of the City/County's expectations, and to propose a comprehensive set of equipment and services that fully satisfy and expand upon this network's baseline level of performance.

The following information summarizes the existing talk path configurations that are contained in Section 2 & Section 4 but this summary shall not relieve Proposers from the obligation to conduct their own investigation, as may be necessary.

## 3.2 Public Safety Needs

### *3.2.1 Talk Paths*

Each of the various public safety agencies utilizes individual talk group structures or VHF channels for existing operations. The original talkgroup structure was created for all agencies. Due to in-building coverage issues experienced by Fire, the City and County Fire Departments converted back to the VHF Nexedge system. Additionally, these agencies are monitored by the 911 Dispatch center on both network to allow interoperability between these agencies during special events and local-area emergencies. For this RFP, Proposers should utilize these existing talk group profiles, plus a 60% future growth factor, in the development of their proposed solution.

| | | | |
|---|---|---|---|
| GPD Dsp | Dispatch | Law Dispatch | Georgetown Police |
| GPD 2 | Channel 2 InformationRecord Checks | Law Talk | Georgetown Police |
| GPD 3 | Channel 3 CartoCar | Law Talk | Georgetown Police |
| GPD EventMA | EventsMutual Aid | Law Talk | Georgetown Police |
| Interop1 | Intersystem Channel 1 | Interop | Mutual AidIntersystem |
| Interop2 | Intersystem Channel 2 | Interop | Mutual AidIntersystem |
| Test | Radio Techs | Other | Radio TechniciansTesting |
| SCEMA Srns | Warning Sirens | Emergency Ops | Scott County Emergency Management |
| SCEMA TA | Weather Spotters | Emergency Ops | Scott County Emergency Management |
| SCEMA WX | Wx Radio | Other | Scott County Emergency Management |
| SCEMA WX | Wx Radio | Other | Scott County Emergency Management |
| SCEMA WX | Wx Radio | Other | Scott County Emergency Management |
| Sct EMA 1 | EMA 1 | Emergency Ops | Scott County Emergency Management |
| Sct EMA 2 | EMA 2 | Emergency Ops | Scott County Emergency Management |
| Sct EMA 3 | EMA 3 | Emergency Ops | Scott County Emergency Management |
| Sct EMS Dsp | Dispatch | EMS Dispatch | Scott County EMS |
| Sct EMS TA | Talk Around | EMS-Talk | Scott County EMS |
| EC to Hsp | EC to Georgetown Community Hospital | Hospital | Scott County EMS |
| SFD Tac 1 | Fireground | Fire-Tac | Scott County Fire |
| SFD TacTrng | Fireground Training | Fire-Tac | Scott County Fire |
| SFD Tac 2 | Fireground | Fire-Tac | Scott County Fire |
| SFD Tac 3 | Fireground | Fire-Tac | Scott County Fire |

| | | | |
|---|---|---|---|
| SFD FireCntl | Fire Control | Fire Dispatch | Scott County Fire |
| SFD Dsp | Dispatch | Fire Dispatch | Scott County Fire |
| SFD Tac 4 | Fire TalkAround | Fire-Talk | Scott County Fire |
| SFD Tac 5 | Fire TalkAround | Fire-Talk | Scott County Fire |
| SFD Trng | Fire Training | Fire-Talk | Scott County Fire |
| Sct SO Info | Information | Law Talk | Scott County Sheriff |
| Sct SO Opns | Operations | Law Talk | Scott County Sheriff |
| Sct SO Dsp 1 | Dispatch Primary | Law Dispatch | Scott County Sheriff |
| Sct SO 2 | Channel 2 | Law Talk | Scott County Sheriff |
| Sct SO 3 | Channel 3 | Law Talk | Scott County Sheriff |
| Sct SO Dsp 2 | Dispatch Alternate | Law Dispatch | Scott County Sheriff |

### *3.2.2 Call Privacy*

The City/County's existing radio networks are intrinsically open to transmission monitoring with any radio equipment operable on those VHF an 800MHz frequencies (i.e., scanning receivers). Additionally, users of this shared network are allowed a measure of operational autonomy in terms of agency-assigned talk-groups and channels.

The new P25 digital voice radio network shall include provisions for call privacy whereby identified users within the network can be excluded from certain talk groups or individual conversations. This provision must offer sufficient flexibility such that the desirable features of agency monitoring can be retained while permitting privacy to conversations that are potentially confidential. The new network shall also incorporate technical features that prevent unauthorized listeners from monitoring any network calls. Ideally, the new network should inhibit the ability of non-network users from monitoring actual voice transmissions of any type as well as preventing such persons from monitoring those call assignments transacted via the network's digital control channel.

Proposers shall describe the scope and operation of such security provisions inherent within their proposed solution that prevent the types of undesired radio monitoring discussed above.

### *3.2.3 Encryption*

Digital voice 256-bit AES encryption, using Advanced Multi-Band Excited +2 (AMBE+2) vocoder technology coupled, **shall be included within the Proposer's expanded P25 network.**

Two modes of encrypted digital voice operation are desired:

1. Unit-to-unit, where conversations in an encrypted talk group are secure. These cannot be monitored at a dispatch or control point.
2. Dispatcher-to-unit, where conversations between the City/County's PSAPS, future Backup/Consolidated 911 Center, Emergency Management, and field units are secure.

The enhanced P25 network shall provide encrypted transmission so that user radio access delays are equal to those in the clear mode. Encrypted transmissions shall not degrade the operation of clear-voice features nor lengthen system access or audio transport delays to other users. Encryption shall not degrade the range or coverage less than normal digital performance.

### *3.2.4 End User Equipment*

The Vendor shall demonstrate P25 operational compliancy by listing, at a minimum, three different manufacturers' whose radios have been tested and certified to function on its proposed P25 infrastructure technology.

In general, Police communications needs have shifted from patrol car based, with equipment fixed within vehicles, to patrolman based where portable equipment is assigned to individual officers. These same user trends exist within the Fire

Department and related public safety agencies. This migration to portable units, with their reduced output power and often-degraded antenna performance, has placed greater technical demands on radio communications network infrastructures. The coverage needs for mobile-based systems are relatively straightforward as the available effective radiated power from a mobile unit can closely approach that of a base station. Talk-in/talk-out balance can thus be easily achieved with simple backbone system configuration.

Portable radio coverage problems are further compounded by the fact that users often operate within radio resistant areas such as warehouses, office buildings, apartment structures, hospitals, and single-family dwellings. The need for reliable communications within building structures requires increased talk-in/talk-out system gain.

Further complicating the design of portable-based systems are desired mechanical and ergonomic features, as summarized below:

1. The radio package, itself, must be compact, light-weight, simple to operate and have a minimum of operator controls or feature selections.
2. Radios contain a microphone, speaker, talk group selector, volume control, power switch, emergency button, and normal transmit push-to-talk button. These input/output devices are subject to near-constant physical abuse within a public safety environment.
3. User must be able to disable message authorization tones.
4. The volume control must be fully adjustable from zero to maximum audio output level.
5. Unit must be extremely rugged to withstand shock and vibration typical of public safety operations. For the Fire Department and Police Department, other features such as Intrinsically Safe operation and the ability for the equipment to survive short term water submersion are required.
6. Units must be operable, within the coverage requirements of Section 7.0, using the smallest unity-gain flexible antenna available.

7. Radio unit battery packs must operate to provide sufficient power for a full twelve-hour work period. A range of accessories must be available for support in-field battery charging.
8. Radio units must be equipped with alphanumeric displays to more readily identify selected talk groups and operating modes, i.e. clear voice, encrypted voice, etc.
9. Radios must be capable of operation with traditional speaker/microphones as well as sub-miniature radio surveillance accessories.
10. In addition to the specific desired features indicated above, all furnished equipment must meet minimum equipment requirements identified in Section 5.0.

### 3.2.5 Gateway/ISSI Interfaces

The utilization of gateway technology provides a useful and important function in the integration of outside trunked and non-trunked radio systems within the City/County's radio communications configuration. Base Station Gateway technology shall interface both analog and digital base stations, on a talkgroup base, within the P25 trunked network solution. By so doing, it is then possible for users equipped with P25 radios operable on the City/County network to select and monitor/control link radio resources.

In addition, the proliferation of Smartphone devices within the commercial and private sector has given rise to applications that provide push-to-talk style communications across broadband devices. The Broadband Gateway now required would interface with the City/County's new P25 network and allow selected Smartphone users to communicate with City/County resources over allowed radio network talkgroups.

The P-25 TIA Specifications now provide for Inter RF System Interface (ISSI) technology which allows the core network controllers of disparate P25 radio systems to transact communications across systems. ISSI is an open standard that has been

embraced by P25-compliant vendors as a means of allowing radio user roaming across vendor radio solutions.

### *3.2.6 Tornado Sirens*

The County has twenty (20) tornado sirens at the following locations.

1. 3217 Newtown Pike – County Fire Station 4
2. 2200 Cincinnati Rd – County Fire Station 1
3. Lisle Road – Georgetown Estates Trailer Park
4. 5130 Owenton Rd. – Minorsville Church
5. 192 Mallard Point Dr. @ Cincinnati Rd
6. 115 Galahad Dr.
7. 116 Pocahontas Trail – Faith Baptist
8. 726 Lemons Mill Rd.
9. Frankfort Rd @ Paynes Depot – Water Tower
10. 475 Connector Rd – Spade Corporation
11. Homestead Parkway – County Fire Station 5
12. 2445 Weisenberger Rd – Weisenberger Mill
13. Sadieville Pavilion
14. Stamping Ground Fire Station
15. 400 Victoria Way - Victoria Estates
16. Toyota Gate 7
17. Toyota Gate 4
18. GMWSS Pump Station – 1245 Lemons Mill Rd
19. 257 Midway Rd
20. County Park – Extension Office
21. Suffoletta Park – 325 Louis B Nunn
22. Royal Spring Rd
23. Voice Receivers at all schools and public facilities.
24. Scott County Park
25. Marshall Park – Softball Fields

- 1 - 20 Activated by computer
- 21- 23 Activated by Radio Tone Only
- 24-25 Lightning Sirens (Automated – No Activation)

These sirens are activated via a tone encoder located at dispatch and the emergency management locations. The goal is to continue to provide the same functionality of the current system and just update the VHF fixed end base station at a new proposed site that provides coverage to the listed locations and replace the mobiles located at the siren locations.

The specification for the base station and the mobile radio is provided in Section 5.

### *3.2.7 Interoperability Links*

Interoperability links will be installed at the best proposed infrastructure sites that will provide the best interoperability with the surrounding counties or state agency sites according to the Kentucky KYFOG plan.

| **Interoperability** | **Qty.** |
|---|---|
| | |
| VHF Nexedge Surrounding County Fire | 5 |
| Fayette County P25 | 3 |
| State of Kentucky VHF | 3 |
| State of Kentucky UHF | 3 |
| State of Kentucky 800 | 5 |

## 4.0 MINIMUM OPERATIVE CHARACTERISTICS

### 4.1 General

Section 3.0, Identified User Needs, described the minimum functionality required by the various the City/County user agencies. In this Section, talk group characteristics for departments now operable on City/County's existing trunked radio system will be presented. From this information Proposers can better determine the scope of services needed to satisfy talk group structure requirements as well as capacity/queuing objectives for this project.

### 4.2 Public Safety Departments

The City Police Department, County Sheriff's Office, City and County Fire District Services, and EMS have utilized the existing trunked radio system or Nexedge radio system for many years. During that time, the various talk group structures and channel plans for each have been modified to better suit individual department needs.

Proposers should assume that the current talk group structure could be essentially replicated or enhanced for the new digital radio network.

### 4.3 Non-Public Safety Departments

City Public Works Departments, County Roads, and other administrative users are likewise operable or being considered to be operable on the proposed radio network.

### 4.4 Intermodulation Study

It is a well-known fact that interference impacts P25 systems in a very negative way, degrading communications regardless of the manufacturer of the radio system. The Vendor must ensure that communications are free of interference or degradation due to intermodulation (IM) products. An IM study shall be required to be provided prior to the Customer Design Review (CDR).

### 4.5 In-Building Penetration

To address the density associated with commercial and industrial structures within the City/County, both existing and proposed for the near future, propagation studies shall assume a minimum penetration loss of -20dB for major building structures throughout the City/County (i.e., hospitals, convention halls, courthouses, etc.). have defined as critical buildings. This need is further discussed in Section 7.

## 5.0 MINIMUM RADIO/MICROWAVE EQUIPMENT REQUIREMENTS

This Section describes the minimum-acceptable requirements for mobile, portable, control station, fixed-site radio and microwave equipment. All radio equipment installed by Contractor shall be FCC type accepted under Part 90 of the FCC Rules and Regulations. Additionally, all RFP proposed equipment shall be in current production and shall meet or exceed the requirements of this Section.

Base station/repeaters shall be furnished and configured to support both APCO Project-25 Phase 1 and Phase 2 modulation formats, imbedded GPS/AVL location data and shall can support trunked mobile data technology. The radio system's trunking controller shall have an interface available to port call-related information such as user id and talkgroup designation to an external computer aided dispatch system provide by others.

If substantial upgrading is involved and required to support P25 trunked mobile data operations, the RFP Response must clearly identify what would be required to "upgrade" the network to support mobile data computing and supportive application software, that provides low speed data applications such as Over-the-Air Rekeying (OTAR), Over-the-Air Reprogramming (OTAP), or GPS x-y coordinates to CAD or other mapping software applications. Responders must be specific in their responses and shall avoid ambiguous statements such as "digital capable, digital ready", "Project-25 capable", etc. Statements of that type when in response to a specific RFP requirement may result in the interpretation of that response as being an exception to this Specifications minimum requirements.

The City/County's three EDACS sites are linked using licensed 4.9GHz microwave. Control stations are used as Dispatch RF links to the three 800MHz EDACS repeater sites and the three VHF Nexedge sites. It is desired that this facility be replaced with simulcast 700/800MHz trunked radio network having an FCC-licensed loop-protected backhaul configuration with

the added precaution of monitored hot standby 6GHz radios for each link segment.

The stated minimum requirements, below, for end-user equipment will not necessarily be required on all individual units assigned to differing user agencies. Section 16.0, Pricing Considerations contains those user radio configurations required for each agency/department. All user equipment must be capable of operating on various P25 radio system manufacturers. The degree of operations on these other radio systems allows for radio affiliation and use of basic communication functions as defined by current P25 published standards and as verified by independent P25-certfied testing facilities.

This RFP allows for Proposers to include proprietary features within their manufactured radio products to differentiate their products from those offered by competitors. Yet, such proprietary features shall not inhibit the operation and attributes of basic P25 functionality as defined by published TIA-102 trunked feature specifications. Any such degradation found during the implementation of the Contractor's equipment may delay system acceptance and shall be remedied by the Contractor at no additional cost to the City/County.

## 5.1 Mobile Radio Equipment

A. Meet APCO minimum recommendations and EIA/TIA standards for Project-25 Public Safety 700/800MHz trunked radio systems. Furnished equipment must be operable on both Phase 1 and Phase 2 infrastructures.

B. Incorporate heavy-duty construction, weather-sealed enclosures and weather-sealed controls to meet Military Standard 810 (latest revision)

for water, shock, vibration, dust, humidity and high/ low temperature performance.

C. Allow operations on Project-25 trunked and conventional (analog/Project-25) systems with priority scan of talk groups or channels.

D. Front mount and rear mount, dual control-head with single rear mount radio and dual radios with single control-head configurations must be available to meet the needs of the different public safety departments. Rear mount radios may require weatherproof control heads, speakers, microphones and other accessories (specific for fire operations). Multi-band mobile radio configurations (using one control head/speaker/microphone to simultaneously control two or more mobile radio transceivers or transceivers having broad-spectrum capabilities) must be available to allow 800MHz trunked/800MHz conventional; VHF/800MHz; UHF/800MHz or VHF/UHF operations, depending upon the types of radio transceivers employed.

These radios must be able to interface to multiple manufactures of external headsets for radio full transmitting and receiving use while driving or operating at the pump panel or any other area designated by the City/County.

E. Incorporate electronic, multi-line alphanumeric displays to provide visual indication of system availability, channel/talk group selection, incoming user ID, call alerts and operational status such as scan and channel busy.

F. Emergency priority button on mobile radio control panels to initiate an emergency priority call.

G. External alarm dry-contact closure to provide activation of a horn, light, etc. whenever the radio unit is individually called.

H. Data transmission capability and appropriate accessory connection to devices supplied by others (i.e., vehicular-mounted computing devices).

I. Digital voice encryption, using P25 compliant IMBE/AMBE+ vocoder technology and federally-approved AES coding, to provide security during transmission and reception of sensitive communications.

J. Radio operating software shall be contained in an electrically erasable memory form that allows remote updating of software configurations and related performance data. Unit shall allow software updates/reprogramming locally from a computer or via the P25 radio network (Over-the-Air Programming or OTAP). Sufficient quantities of programming cables and software shall be part of the delivered equipment. Additional methods for programming user radio remotely shall be considered in addition to P25 OTAP, such as via a private, local Wi-Fi connection or through other secured commercial means.

K. Transmit Time-Out Timer to warn the user of excessive transmission length. Time out timer should automatically disable the radio's transmitter after a pre-determined period, thereby eliminating talk group/channel interference caused by either a defective speaker/microphone or PTT button. Timer should be reset upon operator rekeying (PTT) the radio.

L. Minimum Electrical Specifications as follows:

| | |
|---|---|
| Frequency Range: | 764 to 869MHz (standard post rebanding public safety frequencies) |
| Channel Capacity: | 24 channels/system (8 systems/tiers) |

| | |
|---|---|
| Channel Spacing: | 25/12.5KHz; NPSPAC<br>6.25KHz or TDMA Equivalent |
| Talk Group Capacity: | 16 talk groups/system |
| Primary Input Voltage: | 11 to 16VDC, negative ground |
| Battery Drain: | Standby: 1.5 amperes max.<br>Receive: 4.5 amperes max.<br>Transmit: 15.5 amperes max. |
| Environmental: | MIL-STD 810 (C,D,E,F&G) for shock, vibration, humidity, temperature and blowing rain. EIA/TIA-603 for shock and vibration stability. |
| Talk Group Selection: | Rotary-knob style. |

**Transmitter**

| | |
|---|---|
| RF Output Impedance: | 50 Ohms |
| Output Power: | Sufficient power to achieve required coverage, not less than 10 watts |
| Frequency Stability: | +/- 1.5PPM from -30°C to 60°C |
| Modulation Deviation: | +/- 5KHz for 25KHz Channel (FM)<br>+/- 4KHz for NPSPAC (FM)<br>P25 Phase 1 – C4FM/12KHz channel<br>P25 Phase 2 –TDMA |
| Audio Response: | Within +1, -3dB of a 6dB/ octave |

| | |
|---|---|
| Audio Distortion: | Less than 2% @ 1KHz |
| Spurious/Harmonic: | -60db below carrier |
| Hum and Noise: | -45db or greater |
| Duty Cycle (EIA): | Transmitter 20% |

**Receiver**

| | |
|---|---|
| Modulation Acceptance: | +/- 7KHz |
| Selectivity: | -60dB minimum for 12.5KHz channel. |
| Sensitivity: | -116 dBm (5% BER (C4FM)) |
| Intermodulation: | -75dB |
| Spurious/Image: | -80dB |
| Frequency Stability: | +/- 1.5PPM from -30° to 60°C |
| Audio Output: | 10 watts, with no more than 3% distortion at 1KHz |
| Duty Cycle (EIA): | Receiver 100% |

### *5.1.1 VHF Mobile Tornado Siren Equipment*

Must meet be FCC type-accepted/approved and be in compliance with FCC Part 90 Rules and Regulations.

Incorporate heavy-duty construction, weather-sealed enclosure and weather-sealed controls to meet Military Standard 810 C, D, E, F and G for water, shock, vibration, dust, humidity and high/ low temperature performance.

Allow operations on narrowband analog FM channelization.

Include a radio-to-siren signaling hardwire interface that provides for: Transmit audio; Receiver audio; PTT control; and Receiver Un-squelch/busy notification.

Incorporate electronic, backlit alphanumeric displays (minimum of eight characters) to provide visual indication of system availability, channel selection, and operational status such as transmit-on, receiver scan and channel busy.

Radio operating information shall be contained in an electrically erasable memory device. Unit will be fully programmable from a laptop/desktop computer. Sufficient quantities of programming cables shall be part of the delivered equipment.

Include a transmit time out timer to warn the user of excessive transmission length. Time out timer should automatically disable the radio's transmitter after a pre-determined period, thereby eliminating channel interference caused by a defective siren interface (existing within siren controller).

Mobile radios must be operable on VHF (150-170MHz) Part 90 radio channels.

Minimum Electrical Specifications as follows:

| | |
|---|---|
| Primary Input Voltage: | 11 to 16VDC, negative ground |
| Battery Drain: | Standby: 1.0 amperes, max.<br>Receive: 2.0 amperes, max.<br>Transmit: 10.0 amperes, max. |
| Environmental: | MIL-STD 810 C, D, E, F and G for shock, vibration, humidity and high/low temperature. |

| | |
|---|---|
| Temperature Range: | -30 °C to +60 °C |
| Humidity: | 95% relative humidity at 50 °C |
| Talk Group Selection: | Rotary-knob style |

Transmitter

| | |
|---|---|
| Frequency Range: | 150 to 170 MHz |
| Channel Capacity: | 1 channel pair, programmed/8 channel capacity |
| RF Output Impedance: | 50 ohms |
| Output Power: | Not less than 20 watts, adjustable down to 10 watts |
| Channel Spacing: | 12.5KHz |
| Spurious/Harmonic: | At least 65 dB below carrier |
| Frequency Stability: | 2 PPM from -30°C to 60°C |
| Frequency Spread: | 150-170MHz |
| Modulation: | 11K0F3E |
| Modulation Deviation: | +/- 2.5 KHz for 12.5 KHz Channel |
| Audio Distortion: | Less than 3% at 1 KHz |
| Audio Response: | +1/-3 dB of a 6 dB/octave pre-emphasis characteristic from 300 Hz to 3 KHz |
| FM Hum and Noise (Analog): | -40 dB |
| Duty Cycle: | Transmitter 10% |

Receiver

| | |
|---|---|
| Frequency Range: | 150 to 170 MHz |
| Channel Capacity: | 1 channel-pair, programmed/8 channel capacity |
| Channel Spacing: | 12.5 KHz |
| Sensitivity: | 0.35 µV |
| Adjacent Channel Rejection: | -70 dB |
| Frequency Stability: | 2 PPM from -30° to 60°C |
| Frequency Spread: | 150-170MHz (Full Band) |
| Intermodulation Rejection: | -75 dB |
| Spurious Response Rejection: | -75 dB |
| Audio Output: | No less than 1-watt |
| Audio Distortion: | No more than 3% at 1 KHz |
| Duty Cycle: | Receiver 100% |

Proposer shall inspect the current siren alerting system configuration to determine appropriate installation and radio interfaces, as necessary, to complete a replacement of the existing radio device.

Contractor is required to furnish, install, interface and test the installed mobile radio devices. Owner shall provide all existing documentation of the existing siren system, however, the Contractor remains responsible for the verification of as-built conditions prior to initiation of radio replacement activities.

## 5.2 Portable Radio Equipment

A. Meet APCO minimum recommendations and EIA/ TIA standards for Project-25 Public Safety 700/800MHz trunked radio systems. Furnished equipment must be operable on both Phase 1 and Phase 2 infrastructures.

B. Heavy duty construction and weather-sealed cases to meet Military Standards 810 C,D,E,F&G for shock, vibration, dust, humidity, high/low temperature and blowing rain.

C. Allow operations on Project-25 (Phase 1 and 2) trunked and/ or conventional (analog/ Project-25) systems with priority scan of talk groups or channels.

D. Top-mounted rotary controls with positive stops for volume and channel selection. Control placement must be sufficient to allow gloved-hand operation, as is typically needed by the fire service.

E. Incorporate electronic, multi-line alphanumeric display to provide visual indication of system availability, channel/talk group selected, incoming user ID, call alerts and operational status such as scan, transmit or low battery.

F. Transmit Time-Out Timer to warn the user that the radio may be transmitting longer than a predetermined time limit and then automatically disable the transmitter. Timer is to be reset upon the operator rekeying (PTT) the radio

G. No protruding push-to-talk switch, thereby preventing accidental transmitter operation or damage to the switch as caused by impact.

H. Protected emergency button to allow easy access when needed but incorporating an ergonomic design whereby the emergency function could not be accidentally activated.

I. An accessory receptacle shall be provided for the connection of external devices such as remote microphones or combination remote speaker/microphone units (with or without antenna), vehicular adapters and mobile data computer equipment.

J. Radio operating software shall be contained in an electrically erasable memory form that allows remote updating of software configurations and related performance data. Unit shall allow software updates/reprogramming locally from a computer or via the P25 radio network (Over-the-Air Programming or OTAP). Sufficient quantities of programming cables and software shall be part of the delivered equipment. Additional methods for programming user radio remotely shall be considered in addition to P25 OTAP, such as via a private, local Wi-Fi connection or through other secured commercial means.

K. Portable radios, batteries and accessories (used by the fire service) proposed must be approved by use in hazardous environments (i.e., Factory Mutual as intrinsically safe as per FM Approved Class Number 3640: *Approved Standard for Land Mobile Radios for use in Class I, Division 1 Hazardous (Classified) Locations*.)

L. Carrying case options should include leather-carrying case with swivel mounts, as well as chemical-resistant cases (nylon or similar plastic material) for use by hazardous material groups.

M. Optional surveillance accessories such as miniature microphones, earpieces and remote microphones and headset speaker microphones must be available.

N. Digital voice encryption, using both APCO Phase 1 and Phase 2 vocoders (i.e., Digital Voice Systems, Inc. IMBE and AMBE+ vocoder, respectively) and federally-approved Advanced Encryption Standard (AES) coding, to provide enhanced security during transmission and reception of sensitive communications. It should be possible to re-key encrypted radios remotely via the P25 radio network using a secure method having programmer authentication.

O. Provide single-unit 120VAC rapid chargers capable of fully charging a discharged high capacity battery pack within a four-hour period. Provide optional single-unit 12VDC rapid chargers for vehicular operation. Quantities required are contained in RFP Section 16.

P. Battery packs shall utilize Lithium chemistry and shall operate the proposed radio equipment a minimum of ten-hours using a duty cycle of 5% transmit, 5% receive and 90% standby.

Q. Radios must be operable on post-Rebanding 800MHz NPSPAC frequencies as well as FCC Part 90 700/800MHz conventional and trunked frequencies.

R. User-programmable audible alert notification in the event of loss of P25 network trunked control channel (i.e., out-of-range condition). This must be a standard feature in present and all future-proposed public safety models. Once an out-of-range condition has been observed, the radio (using a pre-programmed sequence of roaming commands/parameters) shall automatically initial and seek to affiliate with an authorized nearby radio system(s), if available.

S. Minimum electrical specifications as follows:

| | |
|---|---|
| Frequency Range: | 764 to 869MHz (standard post Rebanding public safety frequencies) |

| | |
|---|---|
| Channel Capacity: | 24 channels/system (8 systems/tiers) |
| Talk Group Capacity: | 16 talk group/system |
| Channel Spacing: | 25/12.5KHz; NPSPAC/<br>6.25KHz or TDMA Equivalent |
| Temperature Range: | -30°C to +60°C |
| Humidity: | 95% relative humidity @ 50°C |
| Environmental: | MIL STD 810 C,D,E,F&G for shock, vibration, humidity, temperature and blowing rain. EIA/TIA-603 for shock and vibration stability. |
| Talk Group Selection: | Rotary-knob style |

**Transmitter**

| | |
|---|---|
| RF Output Impedance: | 50 Ohms |
| Power Output: | Sufficient power to achieve required coverage, but not less than 2.5 watts |
| Frequency Stability: | +/- 1.5PPM from -30°C to +60°C |
| Modulation Deviation: | +/- 5KHz for 25KHz Channel (FM)<br>+/- 4KHz for NPSPAC (FM)<br>P25 Phase 1 – C4FM/12KHz channel<br>P25 Phase 2 –TDMA |

| | |
|---|---|
| Audio Response: | Within +1, -3dB of a 6dB/ octave |
| Audio Distortion: | Less than 2% @ 1KHz |
| Spurious/Harmonic: | -75dB |
| Duty Cycle (EIA): | N/A |

**Receiver**

| | |
|---|---|
| Mod. Acceptance: | +/- 7KHz |
| Selectivity: | -70dB minimum (25KHz channel) |
| Sensitivity: | -116 dBm (5% BER (C4FM)) |
| Intermodulation: | -70dB |
| Spurious/Image: | -70dB |
| Frequency Stability: | +/-1.5PPM from -30° to +60°C |
| Audio Output: | 500 milliwatts @ no more than 2% distortion |
| Duty Cycle (EIA): | Receiver 100% |

## 5.3 Control Station Equipment

A. Available either as integrated 120VAC-powered desktop radio cabinet or a remotely located, AC-powered radio package each having the capability of being operated via a separate, extended remote control unit (capacity to be operated from no less than two remote locations within 500ft of host control station).

B. Provision shall be provided for both local and remote control operation of the control station.

C. Meet APCO minimum recommendations and EIA/TIA standards for Project-25 Public Safety 700/800MHz trunked radio systems. Furnished equipment must be operable on both Phase 1 and Phase 2 infrastructures.

D. Allow operation on Project-25 (Phase 1 and 2) trunked and conventional (analog/ Project-25) systems with priority scan of talk groups or channels.

E. Digital voice encryption, using both APCO Phase 1 and Phase 2 vocoders (i.e., Digital Voice Systems Inc. IMBE and AMBE+ vocoder, respectively) and federally-approved Advanced Encryption Standard (AES) coding, to provide enhanced security during transmission and reception of sensitive communications. It should be possible to re-key encrypted control station radios remotely via the P25 radio network using a secure method having programmer authentication.

F. Incorporate electronic, multi-line alphanumeric displays to provide visual indication of system availability, channel/talk group selection, incoming user ID, call alerts and operational status such as scan and channel busy.

G. Transmit Time-Out Timer to warn the user that the radio may be transmitting longer than a predetermined time limit and then automatically disable the transmitter. Timer is to be reset upon re-keying (PTT) the radio.

H. Control station packaging shall incorporate sufficient electro-magnetic shielding of radio and power supply components to allow multiple control stations to be located at the same physical site/facility without causing unit-to-unit interference.

I. Proposed control station radios must be operable on post-Rebanding 800MHz NPSPAC frequencies as well as FCC Part 90 700/800MHz conventional and trunked frequencies.

J. Minimum electrical specifications as follows:

| | |
|---|---|
| Frequency Range: | 764 to 869MHz (standard post rebanding public safety frequencies) |
| Channel Capacity: | 24 channels/system (8 systems/tiers) |
| Talk Group Capacity: | 16 talk groups per system/tier, minimum |
| Channel Spacing: | +/- 5KHz for 25KHz Channel (FM)<br>+/- 4KHz for NPSPAC (FM)<br>P25 Phase 1 – C4FM/12KHz channel<br>P25 Phase 2 –TDMA |
| Input Voltage: | 120VAC, 60Hz, single-phase with 3 conductor grounded line cord |
| Environmental: | MIL-STD 810 C,D,E,F&G for shock, vibration, humidity, temperature and |

| | |
|---|---|
| | blowing rain. EIA/TIA-603 for shock and vibration stability. |
| Talk Group Selection: | Rotary-knob and via remote controller(s) |

**Transmitter**

| | |
|---|---|
| RF Output Impedance: | 50 Ohms |
| Power Output: | Sufficient power to provide required radio coverage, but not less than 10 watts |
| Frequency Stability: | 1.5PPM from -25°C to 60°C |
| Modulation Deviation: | +/- 5KHz for 25KHz Channel<br>+/- 2.5KHz for 12.5KHz Channel<br>+/- 4KHz for NPSPAC |
| Emission Designators: | 11K0F3E;8K10F1E;16K0F3E; 8K10F1D |
| Spurious/Harmonic: | At least 70 dB below carrier |
| Audio Response: | Within +1, -3dB of a 6dB/ octave |
| Audio Distortion: | Less than 3% @ 1KHz |
| Duty Cycle (EIA): | Transmitter 20% |

**Receiver**

| | |
|---|---|
| Modulation Acceptance: | +/- 7KHz |
| Selectivity: | -60dB |

| | |
|---|---|
| Sensitivity: | -116 dBm (5% BER (C4FM)) |
| Intermodulation: | -70dB |
| Spurious/Image: | -75dB |
| Frequency Stability: | 1.5PPM from -25° to 60°C |
| Audio Output: | 1.5 watts @ no more than 3% distortion at 1KHz |
| Duty Cycle (EIA): | Receiver 100% |

## 5.4 Fixed Site Equipment Radio – P25 Phase 1/2

A. Meet APCO minimum recommendations and EIA/TIA standards for Project-25 Public Safety 700/800MHz trunked radio systems. Furnished equipment must be operable on Phase 1 and upgradeable to Phase 2 format with just a software update. In simulcast configurations, base stations shall utilize linear RF power amplifiers and function in a linear simulcast mode that minimizes, to the fullest extent possible, destructive time-delay interference within site coverage-overlap regions.

B. Equipment must comply with FCC Part 90 Rules and Regulations for stability, occupied bandwidth/emission mask, spurious emissions and harmonic emissions.

C. Base/repeater stations shall be designed for continuous-duty, 100% operation at full manufacturer's specification.

D. Infrastructure shall incorporate site monitor and infrastructure alarm systems having the ability to report major/ minor infrastructure functionality alarms on multiple, remotely-located alarm console display devices at fixed sites (i.e., dispatch centers, maintenance facilities, etc.). Additionally, the alarm reporting system shall have the capability of being remotely accessed for the monitoring and remote-interrogation of field/site related alarms, using a laptop configuration from any node within the network's IP backbone configuration.

E. All transmitter sites shall utilize 48VDC battery backup subsystems sized of a minimum 8-hour full load capacity and must include auto/transfer with options for natural gas/LPG or diesel fueled standby generator systems. Reuse of existing the City/County's generator facilities is acceptable only where specifically designed within this Specification.

F. The proposed radio network infrastructure shall include a "Fail-Soft" trunking scheme designed to maintain network performance as critical site components fail. Proposed network solutions must be fault tolerant with redundant levels of computer hardware/software, as necessary, to maintain trunked operation to the maximum extent possible during an extraordinary event(s) that could cause multiple failures to quickly accumulate within the network.

G. System infrastructure equipment shall support special services, i.e. encrypted voice, data transmission, multiple Computer Aided Dispatch (CAD) system interfaces, Automatic Vehicle Location (AVL) interfaces, telephone interconnect, audio recording of talk groups, and collection of system operational and historical data.

H. The proposed infrastructure solutions shall have the ability to be expanded with respect to sites as well as RF channels without having to replace previously-installed like equipment.

I. Minimum electrical specifications as follows:

| | |
|---|---|
| Frequency Range: | 764 to 869MHz (standard post rebanding public safety frequencies) |
| Number of Frequencies: | One transmit; one receive |
| Channel Spacing: | 25/12.5KHz; NPSPAC/ 6.25KHz or Equivalent |
| Channel Capacity: | 4, minimally |
| Input Voltage: | Configured for either 48VDC or 24VDC operation per Section 6.2.3.1. |
| Operating Temperature: | -30°C to +60°C |
| Humidity: | 90% relative humidity @ 50°C (typical) |
| Environmental: | Equipment to be located with an HVAC Maintained equipment shelter. Radio/power supply devices to be cooled using thermostatically controlled fans. Fans shall be alarm-monitored for performance and shall initiate a defect alarm once cooling effect has degraded 30% from normal values. |

**Transmitter**

| | |
|---|---|
| RF Output Impedance: | 50 Ohms |

| | |
|---|---|
| Power Output: | Sufficient power to achieve desired coverage, but not less than 100 watts |
| Frequency Stability: | 0.01PPM from -30°C to +60°C ambient. Referenced to GPS-disciplined local oscillator frequency standard in simulcast configurations |
| Modulation Deviation: | 0 to +/- 5KHz (analog-if equipped) Project-25 Phase 1 and II compliant |
| Emission Designator: | 8K00F1D (C4FM) 9K70D1W (WCQPSK) |
| Channel Bandwidth: | 12.5KHz Phase 1; 12.5KHz (6.25KHz equivalent) Phase 2 TDMA (2-slot). |
| P25 FCC Emissions: | 8K10F1D; 8K10F1E; 8K70D1W; 9K70F1D; 9K70F1E; 9K80D7W; 9K80F1D; 9K80FE as may be applicable to Phase 1 C4FM or linear simulcast and Phase 2 linear simulcast; either operable for voice and data communication modes. |
| Spurious/Harmonic: | -70dB |

**Receiver**

| | |
|---|---|
| Selectivity: | -60dB minimum 12.5KHz channel. |
| Sensitivity: | -116 dBm (5% BER (C4FM)) |

| | |
|---|---|
| Intermodulation: | -80dB |
| Spurious/Image: | -90dB |
| Frequency Stability: | 0.01-PPM from -30° to +60°C ambient. Reference to GPS-disciplined local oscillator frequency standard in simulcast configurations |
| Channel Spacing: | 12.5KHz |
| Duty Cycle (EIA): | Receiver 100% |

## 5.5 Fixed Site Equipment Radio – NPSPAC/Analog

A. Meet FCC Rules and Regulations governing 800MHz FCC Part 90 NPSPAC and analog FM operations for public safety mutual aid communications. Minimally, this equipment must comply with FCC technical requirements for frequency stability, occupied bandwidth/emission mask, spurious emissions and harmonic emissions

B. Base/repeater stations shall be designed for continuous-duty, 100% operation at full manufacturer's specification.

C. NPSPAC/Analog base station/repeaters shall be DC-powered and utilize 48VDC or 24VDC battery backup subsystems supplied at trunked radio sites (refer to 5.4E, above and Section 6).

D. Base stations shall be capable of remote control by traditional analog means (4-wire tone control or 6-wire E/M) as well as Radio over IP connectivity.

E. Minimum electrical specifications as follows:

| | |
|---|---|
| Frequency Range: | 806 to 869MHz |
| Number of Frequencies: | One transmit; one receive |
| Channel Spacing: | 25/12.5KHz; NPSPAC/ |
| Channel Capacity: | 10, minimally |
| Input Voltage: | Configured for either 48VDC or 24VDC operation per Section 6.2.3.1. |
| Operating Temperature: | -30°C to +60°C |
| Humidity: | 90 % relative humidity @ 50°C (typical) |
| Environmental: | Equipment to be located with an HVAC maintained equipment shelter. Radio and any related power amplifier devices cooled using thermostatically controlled fans. Fans shall be alarm-monitored for performance and shall initiate a defect alarm once cooling effect has degraded 30% from normal values. |

**Transmitter**

| | |
|---|---|
| RF Output Impedance: | 50 Ohms |
| Power Output: | Sufficient power to achieve desired coverage, but not less than 100 watts |

| | |
|---|---|
| Frequency Stability: | 0.01PPM from -30°C to +60°C ambient. Referenced to GPS-disciplined local oscillator frequency standard. |
| Modulation Deviation: | 0 to +/- 5KHz (25KHz)<br>0 to +/- 4KHz (NPSPAC) |
| Modulation Type: | Analog FM |
| Channel Spacing: | 25KHz;12.5KHz (NPSPAC) |
| Audio Distortion: | 3% at 1KHz |
| Audio Response: | Within +1,-3db of 6dB/octave per EIA |
| Spurious/Harmonic: | -65dB |

**Receiver**

| | |
|---|---|
| Frequency Range: | 806-825MHz |
| Modulation Acceptance: | +/- 7KHz |
| Selectivity: | -85dB (25KHz channel). |
| Sensitivity: | -118 dBm (12db SINAD) |
| Intermodulation: | -80dB |
| Spurious/Image: | -85dB |

| | |
|---|---|
| Frequency Stability: | 0.01-PPM from -30° to +60°C ambient. Reference to GPS-disciplined local oscillator frequency standard. |
| Channel Spacing: | 12.5KHz |
| Audio Distortion: | 3% at rated audio line level (600-Ohm) and local Speaker. |
| Audio Response: | Within +1/-3dB of 6dB/octave per EIA |
| Duty Cycle (EIA): | Receiver 100% |

*5.6 Fixed Site Equipment Radio – Tornado Siren VHF*

A. Meet FCC Rules and Regulations governing Part 90 analog FM operations for public safety mutual aid communications. Minimally, this equipment must comply with FCC technical requirements for frequency stability, occupied bandwidth/emission mask, spurious emissions and harmonic emissions

B. Base/repeater stations shall be designed for continuous-duty, 100% operation at full manufacturer's specification.

C Analog base station/repeaters shall be DC-powered and utilize 48VDC or 24VDC battery backup subsystems supplied at trunked radio sites.

D. Base stations shall be capable of remote control by traditional analog means (4-wire tone control or 6-wire E/M) as well as Radio over IP connectivity.

E. Minimum electrical specifications as follows:

| | |
|---|---|
| Frequency Range: | 150-170 MHz<br>VHF (Tornado Siren) |

| | |
|---|---|
| Number of Frequencies: | One transmit; one receive |
| Channel Spacing: | 12.5KHz |
| Channel Capacity: | 10, minimally |
| Input Voltage: | Configured for either 48VDC or 24VDC operation. |
| Operating Temperature: | -30°C to +60°C |
| Humidity: | 90 % relative humidity @ 50°C (typical) |
| Environmental: | Equipment to be located with an HVAC maintained equipment shelter. Radio and any related power amplifier devices cooled using thermostatically controlled fans. Fans shall be alarm-monitored for performance and shall initiate a defect alarm once cooling effect has degraded 30% from normal values. |

**Transmitter**

| | |
|---|---|
| RF Output Impedance: | 50 Ohms |
| Power Output: | Sufficient power to achieve desired coverage, but not less than 100 watts |
| Frequency Stability: | 0.01PPM from -30°C to +60°C ambient. Referenced to GPS-disciplined local oscillator frequency standard. |
| Modulation Deviation: | 0 to +/- 2.5KHz |
| Emission Designator: | 11K0F3E |

| | |
|---|---|
| Modulation Type: | Analog FM |
| Channel Spacing: | 12.5KHz |
| Audio Distortion: | 3% at 1KHz |
| Audio Response: | Within +1,-3db of 6dB/octave per EIA |
| Spurious/Harmonic: | -55dB |

**Receiver**

| | |
|---|---|
| Frequency Range: | 150-170MHz<br>VHF (Tornado Siren) |
| Modulation Acceptance: | at least +/- 2.5KHz |
| Selectivity: | -60dB (12.5KHz channel). |
| Sensitivity: | -116 dBm (12db SINAD) |
| Intermodulation: | -80dB |
| Spurious/Image: | -85dB |
| Frequency Stability: | 0.01-PPM from -30° to +60°C ambient. Reference to GPS-disciplined local oscillator frequency standard. |
| Channel Spacing: | 12.5KHz |
| Audio Distortion: | 3% at rated audio line level (600-Ohm) and local Speaker. |
| Audio Response: | Within +1/-3dB of 6dB/octave per EIA |
| Duty Cycle (EIA): | Receiver 100% |

## 5.7 Fixed Station Equipment Microwave Requirements

A. Digital voice/data technology shall be used to minimize audio-phase delays and/or incompatibility of audio levels within the proposed radio network solution. Network connective between sites, switches and radio dispatch centers shall utilize packetized Internet Protocol data transfer for both voice and radio control needs.

B. Redundant transmit, receive and base band microwave equipment for each site, configured for automatic hot standby operation, shall be provided. This redundant equipment must automatically switch to the hot standby component(s) upon failure of the primary equipment. This requirement for monitored hot standby equipment applies to loop-switched as well as star-linked or ribbon-link configurations. All microwave links shall be configured with shelter-located RF equipment.

C. Microwave link segments longer than 6 miles shall utilize 6GHz licensed microwave spectrum. Link segments less than 6 miles shall utilize 11.2 GHz licensed microwave spectrum. All FCC frequency coordination, license application preparation and engineering activities associated with the development of the FCC license submittal, including path surveys, as necessary, shall be the responsibility of the Contractor. Any proposed use of unlicensed, spread spectrum microwave links is unacceptable.

Microwave path segments longer than 20 miles shall utilize space diversity antenna systems to improve link resilience during atmospheric fading events.

D. A Microwave Alarm System shall be provided to monitor microwave site functions and to provide alarm status of abnormal operational parameters of equipment associated with the microwave system.

Alarms shall be grouped as 'major' and 'minor' with the ability to sum minor alarms, as may be necessary.

E. An orderwire channel with individual site handsets must be provided to link all microwave locations for testing and troubleshooting. The orderwire shall allow for both individual radio site and multisite group selective calling.

F. A separate 24VDC or 48VDC microwave standby battery system shall be provided and sized for 18-hours of continuous microwave/ multiplex/interface equipment operation at each infrastructure site. An automatic low-voltage disconnect system shall be employed to protect the battery plant from deep-cycle discharge damage. Power supply components shall be configured as, minimally, N+1 redundant at all locations. Batteries shall be sealed type with a service life of no less than ten years.

G. The City/County's P25 radio network shall utilize standard IP protocols using an Ethernet backbone supported by this microwave subsystem (i.e. Multi-Protocol Label Switching or MPLS). Other non-P25 equipment may be co-located at radio tower sites, dispatch centers and other facilities and those may require channelized TDM interfaces. This microwave subsystem must be configured whereby bandwidth interfaces can be configured at RF site nodes in accordance to needs. This could involve: Ethernet based local area networks within tower/switch sites, as needed for the trunked radio equipment elements; virtual point-to-point Radio-over-IP connections to individual HF, VHF and UHF base stations; emulation of 4W/6W control interfaces to legacy analog base stations; and telephony services supportive of 911/Emergency Operations Center(s) distributed throughout the City/County's jurisdictional boundaries.

The Proposer shall supply IP/MPLS network routers and switches as needed to support the P25 radio network and radio dispatch facilities as described by this RFP Specification. Bandwidth utilization shall be 100% packet based using Ethernet as an aggregation layer, with support for TDM traffic using Circuit Emulation Service over Ethernet.

H. Microwave link segment availability shall be no less than 99.99975% (78.8 seconds outage per year). This specification requires a flat fade margin of 40db per link segment, irrespective of the utilization of adaptive modulation techniques. This is a public safety microwave system where bandwidth availability must be preserved during adverse propagation conditions to the maximum extent possible, consistent with sound engineering practice. Exceptions taken to the microwave fade margin requirement by Proposer (s) will result in a "below requirements" scoring in the technical evaluation for both this equipment category and the network reliability category.

J. Proposed microwave antennas, radomes, and antenna mounts must maintain reliable operations during sustained storm force winds of up to 150 mph and shall be appropriately protected from falling ice. Each furnished microwave antenna system shall be equipped with dual stiff arms/mounts to limit antenna vibration and flexing during high wind events. If space diversity is required because of the necessity for higher frequencies and the engineering constraints of longer distances, these requirements and all necessary materials shall be part of the RFP Response.

I. Minimum operational service parameters of each microwave link shall be as follows:

Unfaded Bit Error Rate (BER): Not Less Than $10^{-10}$

Calculated RF Link Fade Margin,

| | |
|---|---|
| Including Circulator, Connector, and Transmission Line Losses: | Not Less Than 40db. |
| Maximum Faded BER: | Not Less Than $10^{-6}$ |
| Link Outage Level: | To coincide with $10^{-3}$ BER, to occur at a signal level not less than 3db more than the calculated RF link fade margin. |
| Link Switching: | Loop or monitored equipment switching shall be automatic and hitless. |
| Environmental: | Equipment shall be configured to operate in a HVAC-controlled equipment shelter. If cooling fans within equipment assemblies are employed, these are to be thermostatically-controlled and electronically alarm-monitored for performance. |

# 6.0 INFRASTRUCTURE SYSTEM CONFIGURATION

## 6.1 General

The radio systems currently used by the City/County, utilize facilities that are located at City/County owned or donated/rental sites. This configuration of existing sites, which has evolved with time, provides less than acceptable wide area and in-building radio coverage. It is required that this new trunked radio network incorporate those necessary facilities to improve coverage, countywide, and within specified building structures.

This Specification Section defines those critical operational and functional expectations minimally necessary to enhance the City/County public safety radio communications reliability, effectiveness and suitability.

The existing configuration of trunked and conventional 800MHz channels is available for reuse in the Proposers new configurations. It is possible that additional 700/800MHz channels can be cleared for this project and this avenue of frequency expansion should be considered within the time constraints of this project (i.e., no greater than an 12-month construction period). Use of new channels within the 700/800MHz band, in a manner that effectively replicates the existing analog configuration, may be possible so long as such use does not adversely impact the implementation schedule. At this point in time, the City/County has not initiated action to license operations on any other 700/800MHz radio channels.

Proposers are required, by Section 6.2, to provide a comprehensive functional and technical proposal for a multiple site Project-25 compliant 700/800MHz simulcast trunked radio network. The new digital voice network shall utilize the necessary number of infrastructure sites, as determined by the Proposer, to meet the City/County coverage requirements.

Proposers shall indicate a guaranteed level of portable and mobile area coverage and delivered audio quality indicative of their design. Alternative multi-site design submittals using radio technologies other than a core simulcast prime component will not be considered as acceptable. The topography of the City/County, coupled with user expectations for highly-reliable portable radio coverage within buildings, can be most efficiently and optimally resolved using the inherent antenna space diversity and receiver-voting characteristics intrinsic of simulcast trunked radio configurations as compared to multisite-switched trunked radio configurations.

Proposers are required to furnish and install transmit and receive site equipment/configurations to meet Section 7.0 (Coverage Requirements) and that adhere to those minimum technical requirements identified in Section 5.0 for fixed site and microwave equipment.

Physical plant modifications to newly proposed City/County-owned sites, rental sites or existing City/County-owned sites, as necessary, to accommodate newly proposed network solutions, shall be the responsibility of the Contractor and must be factored into each Proposal Submittal's cost estimate. A Proposer's failure to disclose physical plant modification cost is contrary to the City/County's turnkey-project requirement and shall result in an unfavorable evaluation of that Proposer's Submittal.

Proposers shall provide all pertinent information concerning their equipment, relative to electrical, mechanical, structural and physical space requirements. Proposers must consider enhanced security and environmental issues in preparing their Proposal Response. Any known deficiencies in City/County-owned sites, as well as for any newly proposed sites, that factor into the proposed solution (inclusive of electrical or lightning protection systems) shall be stated in the Proposal Response.

It shall be the responsibility of the Contractor to provide a turnkey system and to install industry accepted standard electrical grounding systems and

lightning protection devices to protect proposed equipment from damage due to electrical transients on antenna systems, power, telephone and/ or control cables. These costs must be configured into the Proposer's solution.

Sites determined by the Proposer to be potentially prone to flooding or other environmental problems must be so noted by the Proposer in their Proposal Response. Engineering remedies must be based on 100 Year Flood Plain data.

This 700/800MHz digital trunked radio system shall be initially sized to support the existing radio system's user load but is anticipated to grow by approximately 25% additional capacity within the next five years. Therefore, the proposed new radio network shall be capable of straightforward channel expansion via 700/800MHz, without requiring the replacement of previously installed equipment, to support ever-increasing user needs.

The City/County has determined that standards-based APCO Project-25 digital voice radio technology will adequately serve present and anticipated future needs and shall be provided by the Contractor. Initial service requirements involve the continued support of mobile data technologies via leased cellular broadband providers. Proposers must include a description on how their backbone infrastructure equipment can support Over-the-Air Programming (OTAP), Over the Air Re-Keying (OTAR) and GPS location information, in a manner where voice and these data operations are integrated within the same infrastructure component(s).

The delivery and installation of: equipment shelters, security systems, standby and emergency power systems, towers, antenna systems, electrical grounding systems, lightning protectors, transmission lines, cable attachment hardware, ice shields, tower-to-building cable tray hardware and all necessary permitting is part of this project and must be furnished by the Contractor.

All transmit/receiver site-related equipment shall be remotely controlled via digital microwave from the City/County existing 911 Dispatch Center and Emergency Management Center locations. Any proposed use of leased telephone interconnectivity in lieu of a licensed microwave subsystem or City/County-owned fiber-optic facilities (if any at the time of implementation) for all or any portions of this digital radio infrastructure, unless otherwise allowed by this Specification, is unacceptable. It is desired that the radio network's infrastructure be supported by a microwave loop-switched backbone, configured to integrate the network's primary 911 Dispatch Center and Emergency Management Center.

The Contractor shall furnish and install all wiring, wiring hardware, interface electronics and materials necessary, and at no additional cost than that identified in their Proposal/Contract, to complete the successful implementation and operation of their proposed 700/800MHz digital radio network and its related equipment groupings.

## 6.2 Simulcast Configuration

### *6.2.1 General*

Section 2.0 of this Specification generally describes the City/County existing radio communications system. The existing equipment shelters/sites have insufficient space to support additional infrastructure equipment; therefore, Proposers are encouraged to consider new equipment shelters and related support facilities in their newly proposed designs.

Proposers are free to select other sites that they believe are more appropriately suited to support their proposed digital network solution should such locations provide beneficial area coverage, reliability and/or otherwise result in a simplified engineered design. Proposers are required to study radio talkgroup information data provided in this RFP by the City/County to determine the optimum number of channels needed to support future

operations. Proposers shall provide Grade-of-Service calculations and associated recommendations for their proposed network solution and shall provide the per-channel cost (inclusive of equipment, services and maintenance) to expand their digital network configuration beyond that number of channels initially proposed.

### *6.2.2 Control Point (Prime Site) Equipment*

Control Point equipment site shall contain, minimally, the following major equipment and/or software groupings:

System Controller
Simulcast Equalization/ Sync Equipment (Hardware or Virtual)
Console Electronics/ Audio Controller

Redundant local area network routers/switches
Battery & Charger Systems
Adequately sized standby power generator
Connectivity to auxiliary power generator
Interoperability Link Base Stations

ISSI Gateway
Base Station Gateway
Broadband device Gateway
HVAC System
Inert Gas Fire Suppression System

The Contractor shall furnish and install all wiring hardware, cable trays, interface electronics, terminal blocks and materials necessary to complete the successful implementation and operation of this site and its equipment groupings. Infrastructure equipment proposed for the Control Point must meet the minimum requirements specified by Sections 5.0 and 6.

It is acceptable for the Control Point site to also serve as a co-located simulcast radio site. However, the City/County has expressed concern over the potential vulnerability of a single Control Point location, as it could

inadvertently become a single-point failure mode for the new digital radio network. Therefore, Proposers are required to incorporate an optional Redundant Control Point design into their proposed solution. This submittal requirement is mandatory and those proposals failing to include such a dual-site redundancy option will be considered as being unresponsive to these Specifications. Configurations providing the software-equivalent of a hardware-based control point solution will be allowed. An increased number of optional control point locations, either hardware or software configured, may receive additional evaluation consideration.

### *6.2.3 Typical Simulcast Infrastructure Site Deployment*

Proposers are required to supply, turnkey, all technical support, equipment, material and labor necessary to develop each proposed simulcast infrastructure site into a functional 700/800MHz digital radio facility, fully incorporated into the specified communications system. The City/County desires for Proposers to include language that ensures initial beneficial pricing that will be offered for the time periods described in Section 16.

The construction of site access roads and/or availability of electric and gas utilities shall be the responsibility of the City/County. Improvements to the land spaces utilized by the towers, equipment shelters, site grounding, site civil work, security systems, on-site electrical services and standby power systems shall be the total responsibility of the Contractor.

Proposers shall refer to Sections 9.0, 10.0 and 11.0 for specific requirements pertaining to equipment shelters, towers and standby generator systems.

A typical simulcast radio infrastructure site equipment shelter shall contain, minimally, the following major equipment and/or software groupings:

700/800 MHz Simulcast Transmitters (no less than 10 channels)
700/800 MHz Simulcast Receivers (no less than 10 channels)
GPS-disciplined local oscillator (fully redundant)
Simulcast timing/ delay equipment
Receiver Multi-coupler System
Transmitter Combiner System
Transmitter Antenna Systems
Receiver Antenna System
Tower top preamps
Remote site Microwave Links
Site Alarm Equipment
Battery & Inverter Systems
Adequately sized standby power
Connectivity to accessed Emergency Power

Infrastructure equipment (and software, where designed to emulate hardware functionality) proposed for all simulcast sites must meet or exceed the minimum requirements specified by Sections 5.0 and 6.0.

### *6.2.4 Site Power Systems*

The digital radio infrastructure sites shall operate from a 48VDC power source, sized to sustain full trunked-feature operation for a minimum eight-hour period. The battery system shall utilize sealed lead-calcium cells and 100% redundant battery charger components rated for telecommunication service. The service life of this battery system shall be no less than ten years. An automatic low voltage disconnect device shall be provided to protect the battery plant from discharge-related damage.

Electrical power switching/disconnect capability shall exist at all sites such that rectifiers, batteries as well as commercial power sources may be separately isolated in a manner whereby each component may be worked on

safely. This switching/disconnect capability shall be designed and configured such that radio network operation is unimpaired and uninterrupted during any repair or maintenance cycle.

DC plant wiring must incorporate personnel protection panels to prevent the accidental contact of tools or other materials with live DC-powered, high ampacity conductors.

Repeater stations shall be housed in forced-air ventilated equipment cabinets or racks as appropriate. Cabinets shall be free standing and incorporate drilled rails to accept standard 19" rack panels.

A minimum of four DC-operated repeater stations shall be housed in any equipment cabinet. No more than eight repeater stations should be located within a single equipment cabinet. Each cabinet shall be power-supported by redundant, metered DC/DC power converters (if required by equipment design) sufficient to sustain the continuous operation of all repeater stations installed within that one cabinet.

Each equipment cabinet shall incorporate a circuit-breaker power distribution panel incorporating protection for power amplifier, exciter and receiver groupings. Individual repeater station ventilation fan(s), if required, shall be DC powered and thermostatically controlled. Additionally, each cabinet shall be equipped with a DC-operated fan and air filtration components. Each equipment cabinet shall be protected by a DC-power circuit breaker, sized for nominal load plus 35% overload factor.

The primary battery chargers, low voltage disconnects and a primary DC circuit breaker panel shall be installed in a freestanding enclosed relay rack unit. Likewise, the network's server, router and switch equipment shall be installed within cabinets, however, this configuration must be optimally configured where, for example, six or eight rack-units of IP switch or network server equipment is not solely installed in a 70-inch tall dedicated cabinet.

Such configurations that waste precious equipment shelter floor space and are not acceptable.

The radio network's servers, Ethernet routers, and switches and the network server(s) shall be powered from the site's DC Battery Plant using individual, redundant DC-to-120VAC power inverters whose minimum site/system capacity shall be twice that of calculated controller loads, i.e., if a calculated load is 1KW, then the inverter(s) shall be rated for no less than 2KW.

Auxiliary site loads essential to proper system operation, i.e. tower-top preamp, redundant GPS reference oscillators and receiver multi-coupler, shall be interconnected and powered directly by the site's DC Battery Plant.

### *6.2.5 Infrastructure Functionality*

The proposed digital radio solution shall utilize a Project 25 Phase 1/2-compliant digital control channel scheme, whereby user-initiated feature requests and talk group/working channel assignments are processed digitally over a single control channel. The remaining channels shall operate as working channels for digital voice or data traffic. Use of infrastructure solutions involving embedded control signaling in lieu of this single digital control channel concept are contrary to Project-25 requirements and are not acceptable.

Additionally, the single digital control channel shall have a level of redundancy sufficient to meet the overall requirements and intent of this specification for a no-break, life-critical radio communications network. Redundant control channels must automatically rotate in sequence to "exercise" this support capability in a controlled scheme. When not in use as a control channel, the previously-assigned control channel will operate in the trunked pool of digital voice channels.

The proposed solution must be robust in design to assure continued operation should any of the following failures (or combination thereof) occur:

A. Loss of transmitter(s) operation
B. Loss of receiver(s) operation
C. Failure of dispatch console terminal(s)
D. Failure of console/ audio controller
E. Failure of network controller/core
F. Loss of DC-DC power converter(s)
G. Failure of entire single site.
H. Loss of control channel(s)
I. Loss of prime site/ control point

Proposers shall furnish a description of the effect each of the above listed failure modes would have on their proposed network configuration. Proposers shall also describe appropriate mitigation/restoration steps and the amount of time it takes to return the radio network to full operational capability in response to each of the above listed failure conditions.

### *6.2.6 Simulcast Antenna Systems*

The Contractor shall furnish and install antenna systems specifically designed to meet the coverage requirements and objectives described by Section 7.

The Contractor shall equip all antennas systems with gas tube lightning arrestor devices (Polyphasor or equivalent). All coaxial cable elements used as interconnecting jumpers for outdoor-mounted equipment or transmitter components shall be 1/2" Andrew FSJ4-50B or equal. Receiver multi-coupler interconnecting cables shall be 1/4" Andrew FSJ1-50A or equal.

Contractor shall furnish and install hot dip galvanized side mount hardware sufficient to extend the transmitter/ receiver antennas a minimum of 72-inches from the nearest tower-structure element. Transmission lines shall be grounded at the antenna, at 100ft tower intervals, at the top most part of the tower location, at the mid-point (for all towers greater than 200-feet in height), at the location where the transmission lines enter the cable bridge and at the equipment shelter's transmission line copper entry port. Only grounding strap kits, manufacturer-approved for the type of transmission line installed, shall be provided. All transmission lines shall be neatly installed within waveguide ladders. No tie wraps or electrical tape will be allowed for attaching cables to towers.

Antenna system mounting brackets, components and associated transmission line attachment hardware shall be either stainless steel or hot-dipped galvanized steel.

### *6.2.7 System/Audio Control Scheme*

The proposed radio network must incorporate high levels of redundancy to assure continued trunked system operation. To provide the highest level of trunked reliability, site/system voice and control schemes shall be IP-based, fully redundant and utilize distributed processor technology to the maximum extent possible.

Site/System control and network management equipment must include protected power supply units so that the loss of a single power supply device will not interrupt control scheme and network operations.

Site/System controllers, either hardware or software-server based, shall minimally provide the following features:

1. Working channel assignment
2. Verification of user identification
3. Assignment of call priority
4. Electronic documentation of call type, caller/ called, call time, channel assignment, etc.
5. Monitor/control of special system features such as unit-specific calls, telephone interconnect and talkback paging operations
6. Ability to disable/ enable call access to specific field units

The radio dispatch console/audio control and recording scheme shall be equipped to initially support the current dispatch console deployment operable in the existing radio system. The proposed console/audio control scheme must be sized to support a 100% increase in console devices (to facilitate a potential dual-migration/implementation scheme for the 911 Dispatch Center and the Emergency Management Center).

The console/audio control scheme shall be configured to provide IP tunnels to multiple systems located at the various radio dispatcher facilities. These devices shall be of a trunk-tracking design whereby all radio traffic conducted over the proposed number of voice channels and the digital control channel will be archived. The recording device is part of this voice radio communications network project and will be provided as part of this proposal.

### *6.2.8 Radio Network Alarm System*

The Contractor shall furnish and install an automatic alarm system to monitor and alert, as a minimum, status (per site) on the minimum following radio system operating parameters:

Major Alarm Conditions

1. Site/Network Controller Failure.

2. Trunked Base Station Failure.
3. Console/Audio Controller Failure
4. Receive Amplifier Failure
5. AC Power Failure
6. High Reflected Power, Tx Ant.
7. Tower Top Amplifier Failure
8. Receive Multicoupler Failure
9. Battery Charger Failure, Major
10. Generator Failure
11. Generator Run
12. Generator Off
13. Tower Light Failure
14. Over/under temperature alarm (HVAC failure)

Minor Alarm Conditions

1. Door Alarm
2. Tripped DC Breakers(s)
3. Low Transmitter Output (each transmitter)
4. Battery Charger Failure, Minor
5. Low Fuel

A summed major/minor alarm indication should be displayed within each dispatch location. This alarm indication should appear as a flag at a conspicuous area on the radio console's display field. Determination of specific alarm point conditions shall be obtainable from any dedicated alarm system monitoring position, remotely via the City/County's private wide area network or via a virtual private network connection.

The number of total alarm points on a per site basis should be identified and available for future purposes.

The alarm system shall be capable of notifying a group of select individuals via email or text for any/all defined alarms. The alarm system should also be able to have remote monitoring capabilities by the customer or the vendor, if that service is chosen by the customer. The vendor should describe in detail on how the system provides this notification and remote monitoring functionality.

## 6.3 Subscriber Equipment

Mobile, portable and control station equipment requirements are identified in Sections 4 and 5. Specific equipment groupings and quantities are contained in Section 16, Pricing.

It is likely that a majority of indicated user equipment will be ordered at some point during the implementation process but may not be part of the initial system order. Quantities indicated are only approximate estimate and are likely to change.

## 6.4 Interoperability Sub-System

Computer-controlled (radio user initiated) and dispatcher-controlled interoperability link stations shall be located at the most appropriate infrastructure tower location to achieve no less than DAQ 3.4 audio quality into the distant host network. The City/County's preference for interoperability link station placement is at City/County-owned sites, if any are proposed in the design.

All interoperability sub-system antenna transmission lines shall be 1/2" Andrew LDF4-50A or equal and equipped with suitable lightning and electrical surge protection devices.

The proposed network shall include all computer-controller gateway interfaces, analog-to-IP converters, control station(s) and antenna systems necessary to successfully provide the interoperability described above and by Section 3.2.7.

Should a Proposer intend to reuse existing equipment, those types of equipment must be identified in the Proposal Response. If such interoperability equipment is a current component of the existing primary radio system, those items may not be removed from regular operational use if doing so would noticeably degrade existing operational capabilities. Such equipment, however, may be tested during installation and implementation of the proposed network gateway solution and after user migration, may be converted to a resource of the new digital radio network.

Computer-controlled interoperability gateway links shall become active only whenever a user has specifically selected, from its portable/mobile unit, any one of the interoperability link talk groups defined by Section 3.2.7. These links shall also be available for dispatcher monitoring and/or selection.

## 6.5 Voice Encryption

Each of the network's P25 trunked digital RF channels shall be equipped to support voice encryption using the Advanced Multiband Excited +2 (AMBE+2) vocoder.

The number and tiers of radios requiring encryption has been provided in Section 16, Pricing Considerations. Encrypted mobile and portable units shall be of the same model family and general configuration as non-encrypted units. Accessory equipment shall work compatibility with both types of units.

Proposed radio coverage throughout the identified City/County Service Area, in the digital encrypted mode, shall be equal to that in the digital clear mode.

**Proposers may be required, as part of an oral presentation, to demonstrate both clear and encrypted digital voice audio quality using portable/mobile equipment identical to that offered in their Proposal Response.**

## 6.6 Fire Alerting Subsystem

The City/County currently uses several methods for Fire and Medical Paging Alerting from the current consoles.

The proposed fire alerting/paging system should have capabilities to interface to the current Zetron interfaces currently located at the City and County Fire Stations and the City's Computer Aided Dispatch (CAD) system. The current CAD system used by the City/County is New World, AEGIS.

The proposed P-25 radio network will provide a similar or an enhanced solution that provides a minimum of the same functionality as the current system.

The primary connectivity to the Zetron system shall be via the current or an IP connection provided by the City/County. The secondary connection shall be via the current proposed P25 radio network with an interface connected to the Fire Station PA system.

If the current solution is not practical or capable, then the proposer will offer a new solution with the enhanced functionality.

## 7.0. COVERAGE CRITERIA

### 7.1 General

The City/County 700/800MHz Trunked Radio Network shall be designed to support portable hand-carried radio equipment, operated both on street and within residences/building structures, at physical locations throughout the City/County plus the Proposer will identify in their response how far the proposed system will reach beyond the City/County's jurisdictional limits. Proposers must fully identify and guarantee the coverage predicted for their proposed solution, per the functional and operational requirements of this Specification.

Proposers must consider the following operating parameters in the development of their coverage guarantee:

A. Shoulder/microphone units without antennas will be used in most instances and shall be the normal configuration considered for coverage design. Shoulder-level (use without shoulder/mic) and hip-level body (use with shoulder/mic) and obstruction losses must therefore be considered in the proposed network design for both talk-in/talk-out coverage analyses.

B. The smallest flexible antenna available (i.e., quarter-wave) shall be identified and required for portable units. Coaxial-skirt type antennas are not acceptable due to size and other mechanical limitations.

C. Building obstructions exist throughout the City/County Service Area. Most dense building structures are located within the County's principal cities. A listing of specific structures requiring in-building radio coverage is contained in Appendix B and these locations are mandatory service areas. Proposals failing to provide a coverage

guarantee for these structures will be considered non-complaint and will receive a zero-points evaluation grade for this specific requirement.

## 7.2 Service Area

Both mobile radio and portable radio on-street coverage must extend throughout no less than 97% of that area within that land region encompassed by City/County. Desired in-building portable coverage, within in the audio quality and reliability requirements defined by this Section, shall be no less than 95%.

Coverage is defined as the minimum usable signal necessary to provide a clearly readable voice signal without repetition (no syllables lost) from locations within building structures and outdoors, at street level, within the defined, bounded service area. Using the Delivered Audio Quality representations described by EIA/TIA TSB-88D; the delivered audio quality throughout the service area shall be no less than DAQ 3.4 for mobile and portable operations. Coverage maps supplied by Proposers shall depict guaranteed DAQ 3.4 mobile and portable coverage, following the configuration, reliability and service area requirements specified herein. Proposers shall also specify the total area in square miles where DAQ 4.0 mobile unit audio quality is predicted to exist.

All references to coverage reliability in this Specification refer to statistical area reliability. For example, the phrase "97% coverage" indicates that the total area described shall exhibit at least 97% statistical probability that coverage areas, if tested, would be found to support electrical performance which equals or exceeds that minimum signal level necessary to deliver Contracted delivered audio quality, as specified by this Specification and the Contract. However, it will not be acceptable to provide a coverage guarantee which includes a relatively large number of failed points within any one multi-grid area, while still meeting the overall goal of 97% coverage.

The City of Georgetown service area and a two (2) mile perimeter around the City requires an additional 20db of loss inserted into the system design parameters to facilitate radio communications within building structures throughout the City. Loss for this area will be measured as portable indoor talk-out/talk-back with the portable radio on the hip.

The remaining County coverage area requires 6db of loss inserted into the system design for residential and other type buildings located in the rural areas of the County. The I-75 and I-64 Interstate corridors in the County will requires a 10db loss inserted on the interstate and a ¼ mile to each side to each side of the interstate. Any interstate passing thru a 20db requirement will be measured at the stricter loss. In addition, Proposers are required to provide a 20db coverage margin with those specific City/County-located mandatory building structures cited in Appendix B. Loss for this area will be measured as portable indoor talk-out/talk-back with the portable radio on the hip.

### 7.3 Building/Residence Coverage

Coverage shall be no less than 95% inside of the listing of mandatory buildings contained in Appendix B. It is desired that most these building structures shall be supported by the proposed network's fixed infrastructure (tower sites). However, Proposers shall exercise good judgement in balancing the proliferation of costly infrastructure tower sites with the number of building sites improved per new installation. The use of building amplifier systems, while necessary in some instances, shall likewise be minimized in the Proposer's site configuration to the most practical and fiscally responsible extent possible.

Proposers shall specifically identify those buildings identified in Appendix B requiring building amplifier systems and shall provide a comprehensive

turnkey cost to furnish and install such coverage enhancement equipment on a per-building basis where necessary.

If any of these Appendix B listed buildings fail to demonstrate 95% reliable coverage (DAQ 3.4 Audio Quality per section 7.5), the following procedure will be followed:

A. Measurements will be made from every failed test point to determine if in-building loss exceeds 20dB for that specific test point.

B. If penetration loss exceeds 20dB, that specific test point will be omitted from reliability calculations.

C. If penetration loss is equal to or less than 20dB, that specific test point will remain included in the reliability calculations.

D. After determining which (if any) test points are omitted, reliability calculations will be repeated. At that time, reliability of less than 95% for the structure represents a failure for the building.

If insufficient coverage is identified, the Contractor will be responsible for modifying the system, at no additional cost to the City/County, as may be necessary to achieve the required reliability within the failed building. This may include any or all of the following approaches:

1.0 Bi-directional amplifier (BDA) system installed in the building.
2.0 Passive repeater systems installed in the building.
3.0 Satellite receiver systems in or near the building.
4.0 Modifying/adjusting repeater site antenna systems[1]

If any changes are made to the fixed sites (such as re-orienting antenna patterns) to resolve building coverage failures, then a complete re-test of coverage shall be required at no additional cost to the City/County.

Note: the determination to utilize a BDA within any structure will be engineered as a part of a comprehensive system design. BDAs shall not be installed in structures in such a manner or proliferation that creates interference with the overall digital radio network's operation.

The Digital Radio Network shall support no less than 95% in-residence portable radio coverage reliability throughout the land area of the City/County. For defining in-residence portable radio loss factors, Proposers shall assume that the typical in-residence structure occupies up to 2,500 square feet and utilizes single-floor, wood-framed brick veneer type construction.

The Scott County Detention facility will require 100% coverage for this proposal. The floor plans for this facility are included in Appendix C for reference. If the radio system proposed will not meet this requirement, then the proposer will provide a BDA system that will provide the required coverage for this specific building.

## 7.4 Propagation Analysis

Proposers, as part of their Proposal Submittal, shall provide a formal statement that the coverage objectives specified in Section 7.1 - 7.3 are met by their proposed solution. **ANY** exception taken to the specified coverage requirements must be clearly identified with a detailed description of the extent of the exception and the reason for which it was taken, for full consideration to be given to the Proposer during the evaluation process. As stated previously, a Proposer's failure to encompass the Appendix B building list as part of submittal's guaranteed coverage shall be considered non-complaint and will receive a zero-points evaluation grade for this specific requirement.

Proposers shall provide written descriptions of the processes and propagation models used to calculate proposed area coverages. Coverage maps and

other pertinent calculations must be submitted with the following minimum information clearly defined for each map or submittal:

A. Transmitter site power output

B. Antenna gain and type (Include transmission line losses)

C. Effective signal level necessary, at both infrastructure and user radio antenna ports, to produce DAQ 4.0 and 3.4 delivered audio quality in the typical land mobile radio environment

D. Antenna height

E. Portable unit effective radiated power

F. Portable unit effective receiver sensitivity

G. Transmitter site talk out range, individual site as well as composite coverage

H. Portable unit talk-in range, individual receiver sites as well as composite coverage

J. Signal level contours for on-street, in-residence and in-building portable coverage as well as 97% mobile/portable on-street coverage. In-building coverage maps shall depict 6db, 10db, 15db, 20db and 25db loss profiles (the 25db profile is for informational purposes).

In addition to the coverage objectives defined herein, the proposed network must follow: State of Kentucky Region 17, FCC-Approved Regional Plan.

## 7.5 Coverage Acceptance Criteria

Verification of the installed system's coverage is a component part of the Test and Acceptance criteria described in Section 14.0, Phasing and Implementation.

To avoid subjective interpretation of coverage test results to the maximum extent possible, mobile coverage testing shall be done with computer-controlled test equipment. This equipment shall automatically record the position of the test vehicle (by means of GPS positioning) at the time of a reading, and records the signal strength of at least 200 signal samples over a 40-wavelegth period for each reading taken within a test grid. Signal strength measurements shall be made continuously along the drive route. Proposers are cautioned that collecting one 40-wavelength signal level measurement per geographic test grid size (i.e., 1-mile x 1-mile, for example) is not in compliance with this Specification. The full quantity of continuously collected measurements along automobile-accessible roadways passing through grids is required. By so doing, the statistical accuracy of the accumulated signal level measurements closely correlates to the measurement accuracy of the calibrated test equipment, itself.

Test grid sizes within the City's municipal and governmental areas and the I-75 and I-64 Interstates shall be no greater than 1,000ft x 1,000ft. Grids sizes outside of municipal boundaries shall be no greater than 4,000 ft. x 4,000 ft. A minimum of 1,900 accessible grids shall be tested. The City/County or designee and the Contractor shall mutually determine the size/location of grids and a suitable drive route that encompasses the entirety of accessible grids.

Field strength test results obtained throughout the coverage area, in accordance with minimally required reliability percentages, shall be of sufficient level to produce a Delivered Audio Quality (DAQ) rating of 3.4 or higher throughout the predicted service area to be considered passing.

Mobile radio signal strength measurements shall be made from a vehicle moving at approximately 35 mph, but no greater than 60 mph.

The device used to measure field intensity shall be stable and have a dynamic range suitable for the conditions under test. Prior to the execution of these test activities, all test equipment and data gathering equipment to be used shall be fully certified by an independent testing laboratory having calibration tools traceable to the National Bureau of Standards. These certification documentations shall be presented to the Consultant prior to coverage testing for verification.

The test measurement output shall be fed into a laptop computer or an equivalent computer device. The Contractor shall submit a written and/ or graphical report containing an analysis of the test results to the City/County or designee and Consultant daily and a formal report after the test. The results shall be depicted for mobile, portable in-residence and portable in-building coverage. The analysis shall include maps of the coverage area divided into grids, with the test results for drive tests displayed in each grid on a separate map. All test data, in its raw form, shall also be made available to the Consultant for independent inspection.

All mobile or portable radios used for coverage testing will require a mandatory pre-test and post-test with an Aeroflex 3920 or equivalent using the autotest function for the specific radio. The result of each test will be provided via hard copy or electronic copy to the Customer or designee for review and approval as part of the acceptance test procedure. The provided results will include the serial number of the testing device, the serial number of the radio, and the test parameters in which the autotest was conducted.

The City/County or designee reserves the right to disapprove any instrumentation or procedures. During these tests, the network's simulcast transmitter(s) output power shall be monitored by the Contractor and no adjustments made to the transmitter(s), portable/mobile radio units or test

instrumentation after appropriate calibration/alignment of all involved equipment.

For portable radio voice quality testing, all accessible grids shall be functionally tested within the defined coverage area. The City/County's Project Representative, Consultant and Contractor will jointly determine those grid areas to be tested.

The portable radio voice quality testing shall be performed using a minimum of ten phonetically balanced phrases, to be supplied by the Contractor. A successful test measurement shall be one which requires no repetition to understand the spoken phrase and with a DAQ of 3.4. A successfully tested grid is defined as one whereby communications from a dispatch console to a portable (or mobile) radio unit, as well as for the reverse path, are not less than DAQ 3.4 as described below.

| DAQ | DESCRIPTION |
|---|---|
| 5 | Speech easily understood. |
| 4 | Speech easily understood. Occasional noise and distortion. |
| 3.4 | Speech understandable with repetition only rarely needed. Some noise and distortion. |
| 3 | Speech understandable with slight effort. Occasional repetition necessary due to noise/distortion. |
| 2 | Understandable with considerable effort. Frequent repetition due to noise and distortion. |
| 1 | Unusable. Speech present but unreadable. |

Ninety-seven percent (97%) of grids must meet/exceed these defined requirements for the system to be considered coverage compliant.

Audio quality testing within those representative buildings listed in Section 7.3 must be conducted ***manually***, using the voiced procedure described above. Portable audio quality testing for building structures shall be considered successfully completed if of the number of tested areas meeting the previously indicated DAQ audio requirements equals or exceeds 95% of the total number of tested areas. That is, if a hypothetical 100 areas are tested within a given building, then 95 of those tested areas must exhibit audio quality of DAQ 3.4 or greater to be considered acceptable.

The City/County shall designate the test team to participate in coverage testing. The team shall include, at a minimum in each team, a Consultant representative, two Public Safety representatives and a Contractor representative. All test vehicles shall be provided by the City/County. Testing shall commence daily at first light and will cease at dusk. At least three teams will conduct the tests in the interest of timely completion. Each test team shall have a suitably equipped marked public safety sedan type vehicle as an escort or as the test vehicle for the entirety of all hours of testing. Failure of Contractor-furnished coverage test equipment shall not be considered as an acceptable reason for a Contract time extension. The City/County will not pay for retesting caused by delays or equipment failures. Testing will proceed through weekends until concluded.

Final System Acceptance shall not be achieved until the constructed radio network successfully concludes performance test requirements the as-built radio network equals or exceeds the coverage performance guaranteed by the Successful Proposal or as otherwise amended by the Contract. Testing will only be scheduled in period of peak vegetation periods, i.e., June through September. Therefore, it is critical to the acceptance testing phase that Installation and Implementation is conducted on a schedule that facilitates coverage and performance testing during these specified months.

## 8.0 DISPATCHER CONSOLE REQUIREMENTS

### 8.1 General

It is a functional requirement that the existing City/County radio system remain operational during the installation and will remain operational after the acceptance phases of the new Project-25 Digital voice radio network. Any proposal that would cause the temporary interruption of the existing radio system for any duration must be reviewed and approved, in advance, by the City/County or their designee.

Installation of new radio dispatcher equipment must, likewise, be completed in a manner that causes no interference with the operation of the existing radio system. Therefore, existing dispatch facilities must be evaluated by Proposers to determine the most effect means to install and implement their proposed new dispatch console equipment and associated subsystems.

Note: All consoles, wherever located shall be properly and adequately equipped with electrical grounded and surge protection, to industry standards, for operator safety.

## 8.2 Radio Console Locations

### *8.2.1 City Police/Fire Dispatch 911 Center*

The City/County 911 Dispatch facility is located at:

911 Communications Court
Georgetown, KY. 40234.

A total of three, (3) dispatcher and one (1) supervisor console are required at this location.
Each dispatcher position shall be equipped to selectively monitor and control any combination of talk groups, Regional mutual aid and interoperability radio channels. Additionally, dispatch consoles must have the capability of establishing and/or disabling dispatcher-controlled RF/audio interoperability service links as described in Section 3.2.7.

The display equipment at each dispatcher position must be of an LED-backlit design capable of presenting a real-time alphanumeric and graphical color display of pre-configured talk groups; call status and per-call user identification.

Each supervisory dispatch console position shall have the capability to monitor and control pre-configured talk groups, Regional mutual aid channels, and dispatcher-controlled interoperability links. In addition, this console position shall be equipped to perform, at a minimum, the following system management tasks:

A. Emergency unit identification in real time.

B. Real time and historical retrieval of system activity i.e. the types of calls, call duration, when made, user identification, etc.

C. Real time and historical retrieval of special feature activity, i.e. interconnect usage, encrypted voice transmissions, etc.

D. Ability to remotely disable and re-enable selected field units.

E. Ability to regroup individual radios into special talk groups.

F. Assignment of user priority levels.

G. Ability to monitor summed major site/network alarm status.

The supervisory console position shall be equipped with LED backlit color monitor(s) to display those real-time transactions at each dispatcher position and also the system management information described above. Additionally, printer equipment shall be provided to prepare hard copy reports of accumulated system records.

### *8.2.2 Emergency Management and Backup Dispatch Center*

Backup Dispatch Center will be located at:

2200 Cincinnati Road
Georgetown, KY. 40324

A total of three, (3) dispatcher and one (1) supervisor console are required at this location.

## 8.3 Desired Functionality

### *8.3.1 Dispatch Console Reliability*

Due to the critical nature of the communications services provided by these multiple public safety dispatch facilities, a high degree of reliability for the new

radio dispatch console subsystem is required. The radio console subsystem, to the greatest extent possible, shall:

1. Be automatically self-correcting.
2. Provide continuous and automatic self-testing and diagnosis.
3. Alert the operator in the event of component or sub-system failure.
4. Allow continued operation of the remaining consoles in the event of failure to a specific console, without any change to available features and functionality.
5. Be of an IP-based design that eliminates single points of failure.
6. Interconnectivity of voice/control between consoles and dispatch locations shall utilize packet-switching, in lieu of traditional circuit-switched, technologies.

Each radio console shall operate independent of others co-located at any dispatch facility and shall share no electronic devices, such as a common audio switch or gateway. Each radio console shall be equipped with appropriate electrical power conditioning and surge protection as needed to assure reliable system operation during instances where normal electrical power becomes unstable or otherwise corrupted by outside electrical interference.

### *8.3.2 Diagnostics & Security*

The new dispatch console subsystem shall be equipped with multiple self-diagnostic software elements that continuously monitor and verify the correct operation of the console's audio/control IP connectivity. The console's IP connectivity to the host radio network shall be firewalled to prevent unapproved access or configuration changes to be made by unauthorized internal/external entities.

Voice and control communications between the radio network and radio dispatch console position(s) shall be encrypted. On-air voice communications shall be encrypted using the 256-bit Advanced Encryption Standard (AES) and shall remain in the encrypted-mode state between radio and console(s).

### *8.3.3 Power Supply*

It is a critical requirement that power loss or surges shall not affect radio dispatch operations. Power loss or surges shall not alter the system software or operating parameters at the radio dispatch positions. External power to each console shall be supplied by a conditioned 120VAC, 60Hz, single-phase power source.

### *8.3.4 Monitor Configuration*

A state-of-the-art touchscreen 21-inch monitor (LED backlighting) shall be provided for each console position. Each operator shall have the ability to change the radio channel/talk group modules orientation and groupings depicted on any viewed page layer to suit operator preferences. No less than eight sets of console preferences shall be configurable for each console.

### *8.3.5 Headset Jack Configuration*

All radio consoles shall be configured for headset and local-microphone operations. Each console shall provide independent transmit audio level settings for audio inputs from the headset microphone and a gooseneck microphone, such that dispatchers may freely switch operation without affecting dispatch audio quality or cause the introduction of unacceptable audio level differences. An unacceptable audio level difference is one where unintended dispatch audio levels require field users to actively change their local receiver audio settings to mask radio network audio level differences.

Dual headset jacks shall be provided at each position for training and supervisory purposes. These jacks shall be configured such that a supervisor can plug in and either monitor or control a dispatcher's console in parallel with the normally assigned operator/dispatcher.

### *8.3.6 Footswitch*

Each of the radio consoles shall include a footswitch for PTT operation of the selected talkgroups/channel(s). The footswitch shall be heavy duty, rated for constant and continuous use, and shall be designed so as not to skid on a smooth flooring surface. The Contractor shall supply and install a switch for each console position.

### *8.3.7 Master Time Source*

The Contractor shall provide a time generator subsystem of the radio network that references the Global Positioning System and is used to synchronize all consoles, CAD and audio recorder time clocks at all radio console positions/centers. This time generator system shall be made to fully interface to and control the event-time display of the radio consoles, console audio recorder, radio network management tools, radio network alarm system, microwave alarm system and CAD systems at each radio dispatch location.

### *8.3.8 Dispatch Console Positions*

Each of the radio dispatch consoles shall include all controls that apply to the various channel/talk groups and auxiliary functions for the console. Each console position shall contain as a minimum:

- Select Speaker – for audio from selected channels/ talk groups, with volume control.

- Unselect speaker – for audio from unselected channels/ talk groups, with volume control. No fewer than four independent unselected audio sources shall be available and configurable to any radio dispatcher/console position.

- Additional Unselect speaker(s) - One additional speaker shall be supplied with the customer ability to configure specific talkgroups or conventional channels routing of audio to this specific speaker.

- Transmit Function – a color-coded transmit function to control the push to talk (PTT) function for the selected transmitter(s) and/ or talk group(s).

- CTCSS Monitor or Disable Function – shall disable the receiver CTCSS decoder of selected conventional base station(s) for monitoring purposes.

- Clock – shall display GPS-referenced time in twenty-four hour format.

- Tx/Rx Audio Level visual display per each talkgroup/channel module.

- Microphone – desk-mounted gooseneck microphone, cardioid pattern type. This microphone shall be resistant to electrical interference, such as electrical hum for lights or electrical appliances, 700/800MHz radio equipment or other devices such as cellular telephones used in the close physical proximity of a radio console.

- Dual Headset Jack – a dual headset jack shall be provided which will allow for use of a headset equipped with RJ-327 type plug with modular adapter. Separate headset volume/level controls for radio and telephone audio output shall be provided.

- Intercom – intercom functionality between dispatch operator positions shall be provided. A visual display shall be provided to identify both the calling and called parties by console name. Multiple simultaneous intercom conversations between individual consoles shall be possible.

- Private Call – Selected users and dispatchers shall have the ability to selectively communicate "privately" with another individual on the radio network regardless of what talk group either unit is actively monitoring. The intercom call shall allow the two users to utilize a VoIP connection to communicate privately without the participation of other radio units operable with in their respective talk group(s).

- ID Display on the channel window for standard calls, emergency calls and user identification (either by system id or via an 'alias'.

- All Receiver Mute Function – a function which will mute the received audio from all unselected channels shall be provided. This muting function shall be programmable in predetermined increments of sound level.

- Simultaneous Select and Instant Transmit Function – software defined functionality shall be provided that allows the dispatch operator to manually select any combination of console controlled base stations or trunked talkgroups for simultaneous transmissions for an outbound, dispatch-to-multiple-units call. A minimum of sixteen preconfigured simulselect combinations shall be allowed, whose configuration shall be at the discretion of the dispatcher. A patch capability shall also be provided whereby users operable on multiple talkgroups or channels can be "patched" onto a single shared talkgroup and allowed to communicate with each other on a network-initiated ad-hoc talkgroup.

- Emergency/Reset – consoles shall receive emergency alerts from the trunked radio system regardless of the status of the selected channel control module. Emergency messages shall be indicated by a flashing ID,

and emergency ID character and an audible alert. Dispatcher acknowledgment of the message shall silence the audible alert and stop the flashing display. Multiple emergency messages shall be queued in the display stack and the emergency ID character shall continue to flash until all messages have been viewed and subsequently cleared by the dispatcher.

- Alert Tones – the console shall be provided with three distinct tones used for alerting purposes over the air. Each alert tone shall be immediately broadcast, when activated, on the selected radio channel. The following selections shall be available as a minimum:

  a. Alert 1 Steady Alert Tone – shall generate a nominal 1000 Hz steady tone
  b. Alert 2 Warbling Tone – shall generate a warbling tone
  c. Alert 3 Pulsed Alert Tone – shall initiate an automatic sequence, consisting of a nominal 1000 Hz tone, for a period of two (2) seconds

- Paging Encoders – Each console shall include multi-tone paging/ signaling encoder functionality that is accessible, minimally, through the data entry keyboard. The paging encoder shall allow for the dual-path paging for individual or groups of fire engine companies, simultaneously, on two or more conventional channels/talkgroups. In the case of paging tones transacted over the P25 trunked radio network itself, the on-air signaling between dispatch console and field radio shall be in a digital form. The actual, audible paging or alert tones shall be regenerated in analog form at the distant end radio(s), thereby providing for clear, distortion-free tone reception by field users.

- Call Indication – a color-coded status-of-call indicator shall be provided for each talkgroup/channel module configured for each dispatch console. This indicator shall describe status attributes such as call direction (inbound/outbound); mode (clear voice versus encrypted); type: (group, individual, other) and type (Phase 1 or Phase 2).

- Individual Volume Adjust – shall be provided for each talkgroup/channel module operable on the console. Associated color-coded status indicators shall continuously show whether the module is in the full or adjusted-level state. This individual volume adjustment mode shall be automatically bypassed whenever a talkgroup/channel is placed into selected status.

- Talk group/Channel Cross Patch (specified previously in this Section)

- Channel/Group Name – designated channel/talkgroup modules shall allow for a minimum of sixteen alphanumeric characters/symbols to identify each channel/talkgroup.

- Talk Group/Channel Busy Indication – Each module shall include a visual flag depicting the operational status of each channel/talkgroup in real time.

### *8.3.9 Display/Console Installation*

The installation of the display/monitor equipment, speakers, IP network interface and related equipment supplied for the radio dispatch positions shall be mounted on or within console furniture provided by the City/County. Contractor-furnished wiring and cabling shall be installed in a neat manner, which is approved by the County or designee and protected from physical damage. Cable raceways shall be used where possible. No Contractor installed cabling shall create a safety or mobility problem for dispatch personnel.

## 8.4 Console Electronics

### *8.4.1 Description*

Console electronic circuitry shall be housed within an equipment enclosure specific for each dispatch console position. When installed by the Contractor, sufficient space for front and rear servicing of this equipment shall be provided. The use of a centralized, shared console electronic bank that supports audio and control signaling for multiple dispatch console positions is unacceptable.

Console electronic enclosures shall contain the various microprocessors, console interfaces, auxiliary function interfaces and other interfaces needed for system operation. All externally-mounted devices and accessories that make up a console position shall utilize standardized connector schemes (i.e. RJ-45, USB, etc.).

### *8.4.2 System Interfaces*

The digital voice network shall include that circuitry/gateways required to operate remotely-controlled base stations and the outside trunked simulcast repeaters as described by this Specification and in the Proposer's Submittal. At a minimum, each base station interface shall consist of a plug-in circuit card (or the software equivalent) containing Radio over IP (RoIP)-related circuitry, line driver amplifiers, two-wire and four-wire receive amplifiers, digital automatic level adjustment circuitry and fault-diagnostic circuitry. The radio interface, if a universal device, shall be capable of remotely controlling base stations via RoIP and E/M multiplex-channel and 2175Hz tone-burst signaling.

### *8.4.3 Auto Diagnostics/Self-Healing and Diagnostic Features*

The radio dispatch subsystem shall be equipped with multiple self diagnostic capabilities that shall be configured to continuously monitor and verify the correct operation of each console-specific microprocessor, each audio pathway configured in the console's operational software and between the dispatch console and the radio network. In the case of voice transactions using the Internet Protocol, specialized coding shall be used to assure the timely delivery of audio packets to destinations such that recovered or transmitted audio is absent of noticeable voice delays or audio truncation.

### *8.4.4 Console Auxiliary I/O Functions*

Unless otherwise specified within this document, all external auxiliary input and/or output (logic or relay) functions shall be controlled through an auxiliary interface module. These functions shall be controlled from the console position as required.

## 8.5 Remote Console Application

The proposer should provide an IP console application that can be used from a laptop or tablet with an internet connection.

The proposer will provide the specifications necessary for the laptop or tablet and the bandwidth necessary to support a reliable console application in this method.

A total of three (3) console applications shall be provided for this remote application.

## 8.6 Fallback Control Stations

Each dispatch and supervisory position shall be equipped with a 700/800MHz trunked control station to permit radio dispatch operations to continue in the event of radio console equipment or connectivity failures. These control

stations, in addition to the minimum requirements specified by Section 5.3, must contain an alphanumeric display to provide information on talk group/channel selection, user ID and emergency call alerts.

Fallback control stations shall be equipped with a secondary headset jack, similar in form and function to that used for radio console operation. The same headset used for normal dispatching can thus be used for control station dispatching. Fallback control stations should likewise be equipped with a foot pedal PTT switch. To avoid operator confusion, this control station footswitch shall be painted red to differentiate between the normal dispatch console's footswitch (black).

The backup center control stations should follow this same configuration.

## 8.7 *Trunked* Logging Recorder

The proposer is required to provide a P25 compliant logging recorder, for the ECC and an optional recorder for the backup center. These recorders will have the capacity to include all the P25 radio system channels and E-911 telephone lines. The total number of required channels is eight (8) analog 911 phone lines and six (6) administrative lines for the ECC and the Emergency Operations Center has fourteen (14) administrative lines.

The backup center will have capacity to include the five (5) P25 control stations and ten (10) administrative lines.

### *8.7.1 Logging Recorder System*

The recording system shall be configured for 60 channels capable of recording Public Safety Radio, telephone, video, and data communications in one system with future capability of 90 channels.

The recording solution must support multi-channel, simultaneous recording, and multi-user playback of the following; analog, IP, SIP, VOIP, ROIP, and IP channels for P25 Phase 1 and Phase 2 trunked and conventional radio networks and must include all equipment and licensing to connect to the proposed radio network.

The identified requirements focus on supporting a complete turnkey IP Trunked Logging Recorder that complies with APCO and NENA NG9-1-1 industry standards.

The Recorder shall be designed to record in a 24/7/365 continuous operation with five 9's reliability and resiliency.

The Recorder shall also be easily scalable and configurable for recording communications of a single PSAP as well as consolidated multi-site organizations with centralized administration and secure remote user access.

The Recorder shall be provided in a commercial-off-the-shelf (COTS) platform.

The Recorder shall conform to NENA i3 Specifications and must support XML interface standard.

The Recorder shall be able to provide a standard technology 19" rack mounted configuration.

The Recorder shall support remote maintenance via customer provided VPN.

The Recorder shall provide the capability to save any recorded call in standard MP3 or WAV file format for playback on any multimedia Windows PC without the need of proprietary software. These files may also be transmitted as email attachments.

The Recorder shall be capable of real time live monitoring over the LAN from any Windows-10 workstation(s).

*8.7.2 Training*

The Proposer shall provide comprehensive training programs for system. Operators, Administrators and Maintenance personnel shall be included. The system's operation course shall provide the necessary skills for everyday system operation. A maintenance course shall be included to enable technicians to monitor system integrity and enable them to troubleshoot most problems to the level of board replacement. Documentation will be provided.

*8.7.3 Maintenance*

The maintenance provider shall provide a 24-hour per day, 7 day per week hotline for emergency technical support. Maintenance provider shall have qualified repair technicians available to perform emergency on site repair.

*8.7.4 Warranty*

The PSAP manufacturer's hardware shall be covered for parts and labor under a one year (minimum) warranty.

### *8.8 Console Furniture Requirements*

Dispatch console furniture will be replaced as part of this RFP. The Contractor shall furnish new console furniture to replace the following dispatch and 911 positions at the 911 Center located at:

911 Communications Court
Georgetown, KY. 40234.

A total of three, (3) dispatcher and one (1) supervisor positions are required at this location. A total of two (2) 911 Calltaker positions are also required at this location.

The City had done a previous design and the recommended layout with the 911 Center's dimensions is provided in Appendix D.

Dispatch console furniture will also be considered as an option at the Emergency Management Center/Backup Dispatch Center located at:

2200 Cincinnati Road
Georgetown, KY. 40324

A total of three, (3) dispatcher and one (1) supervisor positions are required at this location. A total of two (2) 911 Calltaker positions are also required at this location.

The proposer should provide a recommended layout based on the space available at this location.
These basic considerations will be taken into account for each console furniture workstation position at both locations:

Dispatch Center Workstation

1. Each workstation must have the ability to easily adjust workstation surface to user defined levels.

2. Each workstation must have the ability to elevate assigned computer monitors.

3. Each workstation must have the ability to adjust elevated monitors to user defined height and tilt angle.

4. Each workstation must have adequate storage for computer towers and storage must be easily accessible.

5. Each workstation must have adequate leg room and a foot bar.

6. Each workstation must have the ability to install a personal environmental control. Personal environmental control system must be easily accessed by operator. Controls must be simple and easy to use.

7. Each workstation must have adequate cable management facilities.

8. Each workstation must have the ability to provide electrical connectivity to different sources of power.

9. Each workstation must have adequate storage space.

10. Each workstation must have adequate electrical capacity to meet the assigned system needs.

11. Each workstation must have the capacity to install a number of network connections.

12. Each workstation must have the ability to provide task lighting.

## Chairs

1. Each workstation must have a chair.

2. Each chair must be rated as a twenty-four (24) hour chair intended for use in a twenty-four (24) hour operation.

3. Each chair must have the ability to adjust height, lumbar, and tilt angle.

4. Each chair must have a lifetime warranty for all operating parts.

5. Each chair must be easily cleaned.

6. The load capacity of the chair of the chair should accommodate up to 400#.

## Carpet (911 Center Only)

1. Anti-static

2. 2’ x 2’ squares

3. Ability for Chairs to roll easily

## 9.0 SPECIAL SYSTEM REQUIREMENTS

### 9.1 Generator Equipment Requirements

Standby power generator systems shall be furnished by the Contractor for each proposed 700/800MHz simulcast infrastructure and prime site/control point site. The Proposer shall include the necessary labor and materials, as required, to furnish and install: LPG fuel tanks, gas line attachments (where natural gas service is available), automatic transfer switches, manual-operated auxiliary generator connector facilities, generator/fuel tank foundations/platforms, alarm functionality and electrical wiring services to provide fully operational standby power systems. **Generators shall be housed within newly proposed shelters to match proposed site designs.**

#### *9.1.1 General Requirements*

It shall be the responsibility of the Contractor to provide, install and test a complete and operable standby power generator with automatic transfer switch. Equipment shall be new, factory tested @ 0.8 power factor for 3-hours, and shall be installed adjacent to the required radio equipment shelters, in accordance with local area building and electrical codes. Generator shall be installed within the new equipment shelter, in order to protect the unit from temperature extremes and wind-driven debris.

The LPG fuel tank shall be an underground type. The tank shall be coated with a corrosion-protective membrane and shall also incorporate a cathodic protection system. In areas prone to flooding, the Contractor shall install concrete and secure the tank in order to provide sufficient weight to offset the buoyancy of an low or empty tank. An at-grade access door shall be provided that allows for fuel-filling the below-ground tank and also for protection of the fuel gauge and pressure regulator, as required.

*9.1.1.1 Documentation*

The following documentation shall be supplied by the Contractor for the generator set and transfer switch supplied:

- Specification and data sheets for the exact type and model generator and transfer switch supplied pursuant to this procurement, including all options and accessories included.
- Manufacturer's certification of prototype testing
- Manufacturer's warranty documents
- Shop drawings showing plan and elevation views of the equipment and its location at the site facility.
- Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point-to-point manner
- Manufacturer's installation instructions
- Operator's and maintenance manuals that outline routine maintenance and troubleshooting procedures
- Transfer switch manual and wiring diagram.

*9.1.1.2 Start-Up Service*

A factory authorized service representative shall provide initial start-up service and shall conduct on site acceptance testing. Load test records for the installed generator system shall be furnished to the City/County.

*9.1.1.3 Type of Generator*

Each generator package shall include a dual-fuel (natural/LP Gas fueled), four-cycle, engine-driven set coupled with low reactance, brushless 120/240vac single-phase generator. Each generator package shall be equipped with a temperature compensated automatic voltage regulator; under/over-speed protection function; a control panel; and high ambient-temperature cooling system.

*9.1.1.4 Ratings*

Output power rating of each generator shall be sized for the full calculated load for the affiliated site, inclusive of a 50% excess load factor. In no instance, however, shall any generator set be configured for less than 45KW output. Each generator shall be capable of **continuous 144-hour operation**, full single phase output @ 1.0 pf. The following specifications shall also apply:

Voltage Regulation: Maintained with +/- 2% of rated voltage for constant load between no load and full load.

Frequency Regulation: Maintained within 0.5% from steady state no load to steady state rated load.

Single-Step Load Pickup: 100% of rated output power, less applicable de-rating factors, with the engine generator at operating temperature.

*9.1.1.5 Generator Set Control*

Each generator shall be a remote-start type compatible with the automatic transfer switch to be supplied pursuant to this procurement. Manual starting and stopping shall be provided from the transfer switch control panel.

Cranking control: Shall provide a minimum of three cranking cycles of at least 15-seconds before lockout and activation of an over-crank alarm condition.

Each generator shall automatically shut down and lock out upon:

- Failure to start (over-crank)
- Over speed
- Low lubricating oil pressure
- High engine temperature

Alarm contacts (Form-C) shall be provided to allow transmission of fault alarms for any of the above conditions: low oil pressure pre-warning, high coolant temperature *pre-warning*, low coolant temperature, low fuel and an alarm indication when the generator set is running. These alarm contacts shall be wired into and shall be reported by the radio network alarm system being supplied pursuant to this procurement.

Meters shall be provided, and located both at the generator and within the equipment shelter, to indicate output voltage, output current, running time, and frequency/RPM. An AC Voltage rheostat shall be supplied for fine tuning of the generator's output voltage. Metering devices and the AC Voltage control device shall be mounted either on the transfer switch door or a separate, remote panel.

*9.1.1.6 Fuel Supply*

The Contractor shall supply a new underground LPG fuel storage tank The fuel tank shall provide sufficient fuel to provide six days of continuous operation of the generator set, at full load under low ambient temperature 20-degrees Fahrenheit. The tank shall be refilled after the Contractor's successful conclusion of radio network acceptance tests.

Fuel lines shall be buried below the frost line. At any point at which the fuel line exits above grade, the line shall be insulated to reduce condensation at the regulator. A low fuel level alarm shall be provided.

All necessary regulators, drip pots, piping, meters, or other supplies needed for an installation which meets local fire and building codes shall be furnished and installed by the Contractor.

Contractor shall supply a full fuel tank at time of System Acceptance.

*9.1.1.7 Exhaust System*

A residential-grade exhaust silencer shall be installed on the generator.

*9.1.1.8 Battery and Charger*

A lead acid starting battery, rated for the engine type to be supplied, shall be furnished and installed with each generator package. This battery shall be float charged by a 10-ampere, voltage-regulated charger which is powered by a protected 120VAC source. Float, taper and equalize charge settings shall be provided. Battery charger shall be physically located within the generator transfer switch enclosure.

Form-C charging system alarm contacts shall be provided and connected to the radio network's alarm system to report loss of AC power, low battery voltage and excessively-high battery charging current.

*9.1.1.9 Cooling System*

A radiator-cooled engine is required. The radiator shall be filled with a water/coolant mixture in accordance with the engine manufacturer's recommendations.

A thermostatically-controlled water jacket coolant heater shall be provided and installed in accordance with the manufacturer's recommendations.

*9.1.1.10 Base*

The generator set shall be mounted on a heavy-duty steel base which is, in turn, anchored to equipment shelter floor. The base shall maintain alignment between generator set components and shall include vibration isolators.

## 9.2 Transfer Switch Requirements

An automatic transfer switch which provides switching of the equipment shelter electrical load between commercial power and generator power shall be supplied and installed for each installed standby generator. Each transfer switch shall be completely factory assembled and shall contain electronic controls designed for surge voltage isolation, with voltage sensors on all phases of both input power sources.

Permanently attached manual transfer handles shall also be installed on the transfer switch. The switch shall provide positive mechanical and electrical interlocking and mechanically-held contacts. Quick-make and quick-break contact mechanisms shall be provided for manual transfer under load.

Each transfer switch shall be installed in a key locking, UL listed, NEMA cabinet to be mounted on a wall within the radio equipment shelter. The switch shall be fully wired and integrated with the engine generator set in accordance with local electrical and fire codes.

A manually-operated transfer switch, as well as appropriate power connectorization, shall be provided and installed to allow the interconnection of an auxiliary, trailered generator set (provided by others) should the permanently-located generator fail in operation.

All transfer switches and accessories shall be U.L. listed and labeled, tested per U.L. Standard 1008 and CSA Approved.

### *9.2.1 General Specifications*

Transfer switches shall be double-throw electrically and mechanically interlocked and mechanically held in both positions.

Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishment. Arc chutes shall have insulating covers to prevent inter phase flashover.

Form-C contacts shall be provided in each main switch position for alarm reporting purposes. These contacts shall be connected to the radio network's alarm system for reporting transfer status.

Each transfer switch shall be continuously rated for operation in ambient temperature ranges of -40 to +50 degrees Celsius. Transfer switches shall be rated, minimally, to carry the generator's full rated output, inclusive of the 50% added capacity over calculated equipment loading.

The Line-In; Generator-In and Load site terminations for the automatic transfer switch shall be protected from lightning transients using a combination of MOV and avalanche solid-state clamp technologies. All alarm and instrumentation wiring from the generator, that enters the equipment shelter, must likewise include appropriate lightning surge protection in the form of solid-state, fast-acting voltage clamp devices whose clamping voltage is closely matched to normal individual-alarm signal amplitudes.

### *9.2.2 Automatic Control*

Transfer switch control shall be solid state and designed for a high level of immunity to power line surges and transients. The device shall be tested in accordance with IEEE Standard 587-1980 (or latest revision). Controls shall

have optically isolated logic inputs, and isolation transformers for AC inputs. Relays shall be installed on all outputs.

Solid state under voltage sensors shall simultaneously monitor all phases of the standby power source and the commercial power source. Pick up and drop out voltage settings shall be adjustable. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase.

Controls shall be provided with solid state over voltage sensors, adjustable from 100-130% of nominal input voltage to monitor the source. An adjustable time delay shall be provided.

Automatic controls shall signal the engine-generator to start upon signal from normal source sensors. A time delay start, variable from 0 to 5 seconds, shall be provided to avoid nuisance startups. Battery voltage starting contacts shall be gold, dry type contacts which have been factory wired to a field wiring terminal block.

The switch shall transfer when the emergency source reaches the set point voltage and frequency. A time delay shall be provided for transfer that shall be continuously variable from 0 to 120 seconds.

The switch shall retransfer the load to commercial power after a time delay. This time delay shall be variable (adjustable) from 0 to 30 minutes to avoid short engine run times. The retransfer time delay shall be immediately bypassed if the emergency generator fails.

A control shall automatically signal the engine generator to stop after a time delay, which shall be adjustable from zero to ten minutes, the time starting upon return to commercial power.

Power for transfer operation shall be from the source to which the load is being transferred.

Diagnostic indicators shall be provided to allow the last successful step in the sequence of control functions to be pinpointed. The present status of the control functions shall also be indicated. These functions, at a minimum, shall include:

Source 1 OK
Start generator set
Source 2 OK
Transfer timing
Transfer complete
Retransfer timing
Retransfer complete
Timing for stop

### *9.2.3 Front Panel Control Devices*

A key-operated selector switch shall be provided which will provide the following functions:

Test - to simulate commercial power loss to allow testing of the generator set with or without transfer of the load.

Normal - leaves the transfer switch in its normal operating position

Retransfer - a momentary position which will provide an override of the retransfer time delay and cause immediate return to the commercial power source (if available).

### *9.2.4 Exerciser Clock*

Each transfer switch shall be equipped with an exerciser clock which allows setting the day, time and duration of a generator set exercise/test period. Tests under load or with no load shall be selectable.

## 10.0 GENERAL EQUIPMENT SHELTER/TOWER REQUIREMENTS

### 10.1 Shelter Design Considerations

10.1.1 Equipment shelters shall be of a skid-mounted, bullet-resistant, prefabricated concrete aggregate type designed to house the site's standby power generator, radio communications base stations and related sensitive electronic equipment.

10.1.2 The interior wall measurements shall be no less than 10ft high, 12ft wide and 30ft long. The dimensions of the shelter will be for the proposed equipment racks with a 100% growth factor. Exterior dimensions shall include nominal wall, roof and skid dimensions, to be determined by Proposer.

10.1.3 Equipment shelters must provide an interior climate suitable for the operation of sensitive electronic equipment, that is, it must be dust proof, watertight and airtight. A separate, isolated section within the shelter structure shall be provided for housing and operating the standby generator unit. A separate access door for servicing the generator unit shall be provided. The generator section shall be sufficiently vented to allow the proper operation of the equipment and shall be appropriately insulated to prevent excessive heat buildup within the secured radio equipment section. An automatic fire suppression system shall be provided by the Contractor.

10.1.4 Each equipment shelter shall be supported by a concrete pad with attachment devices appropriate for securing the building assembly to survive hurricane force (no less than 120-mph) winds. In the case of

sites determined by FEMA 100-Year Flood maps as requiring elevation due to potential flooding, the affected equipment shelter shall be set on poured concrete piers or a galvanized steel framework. The finished length of piers/framework shall extend, minimally, four feet above ground level but otherwise in accordance with FEMA's 100-Year flood plain elevation height plus a two-foot contingency margin.

10.1.5 Skid components, attachment hardware, cross-braces and lifting eyes shall be hot-dipped galvanized after fabrication.

10.1.6 Shelters shall be designed to withstand sustained hurricane force winds not less than 120-mph.

10.1.7 The exterior wall finish shall be exposed aggregate. Seeding of aggregate for an exposed aggregate finish is not acceptable. Exterior walls must be bullet proof as defined below.

10.1.8 The roof shall be a flat, tapered type having a minimum slope of 1/2" per foot from the roof centerline.

10.1.9 All exterior wall, floor and roof joints shall be sealed using a compressible, resilient sealant. There shall be no exposed roof-to-wall or wall-to-floor joints.

10.1.10 Cement used in concrete shelters shall be standard Portland cement conforming to the requirements of the "Standard Specification of Portland Cement", ASTM Designation C150. Concrete aggregate shall conform to the requirements of the "Specifications for Concrete

Aggregates" ASTM C33 and "Specifications for lightweight aggregates for structural concrete" ASTM C330.

10.1.11 Exterior concrete surfaces shall be sealed with a minimum of two coats of Thoroglaze H Sealer or equal.

10.1.12 The shelter's interior floor shall be covered with 1/8" x 12" x 12" industrial weight solid vinyl floor tile. Floor color shall be light beige.

10.1.13 Walls shall have a minimum thermal insulation factor of R11.

10.1.14 The shelter's roof shall have a minimum thermal insulation factor of R19.

10.1.15 Interior wall surfaces shall be faced with white vinyl/coated wood paneling.

10.1.16 The interior ceiling surface shall be a white, vinyl coated plywood. Seams in the plywood shall be trimmed with batten strips painted to match the ceiling.

10.1.17 Building openings for the door, air-conditioners, transmission line entrance and other entries shall be framed and sealed in such a manner that moisture cannot penetrate the insulation within the walls or the interior walls of the structure.

10.1.18 A single 36"W x 72"H x 3" thick insulated bulletproof steel door, equipped with a three-point latch, shall be provided for access to the equipment section. A similar door entry shall be provided for the

generator section and shall be appropriately sized by the Contractor. All door hardware shall be stainless steel and incorporate three external hinges having non-removable hinge pins. Door shall open outward to maximize internal building utilization.

The term 'bulletproof" is defined, for this Specification, as unable to be penetrated by a .30-06 or .308 commercial cartridge firing a lead tipped, 160-grain projectile, at not more than 2600 fps muzzle velocity. The projectile will be test-fired at a range of 100 yards. The structure/material must not be completely penetrated at that distance.

10.1.19 Fiberglass exterior awnings shall be provided to protect the door entrance and air-conditioner units.

10.1.20 All hardware used on the exterior surfaces of this shelter shall be either hot-dipped galvanized or stainless steel.

10.1.21 Wafer or particleboard wood products are not an acceptable construction material for this project.

10.1.22 Contractor shall provide detailed fabrication drawings for the pier concrete foundation (or steel frameworks), designed to adequately support the proposed building structures and wind loads. Additionally, the building frame shall be mechanically bonded to the concrete/steel foundation. Underground fuel tanks shall be restrained from floating and must be secured to prevent buoyancy of a tank of the required capacity at a 95% fuel empty status.

All building and foundation detail drawings and related calculations must be reviewed and approved by a State of Kansas registered professional engineer.

### 10.2 Shelter Electrical Requirements

10.2.1 Each shelter shall be equipped with overhead cable trays located above all planned equipment cabinet groupings. Auxiliary cable trays shall be provided to support transmission lines and telecommunications cables, as necessary. All cable tray joints shall be electrically bonded using No. 6 AWG copper wire jumpers with approved compression fittings. Trays shall be bonded to the interior ground halo.

10.2.2 Individual, properly grounded 120VAC, 20A electrical circuits shall be provided to each of the equipment racks/cabinets. Each shall be terminated as a single, duplex outlet mounted on the cable tray directly above the center of each planned equipment cabinet.

10.2.3 Individual, properly grounded 240VAC, 30A electrical circuits shall be provided for each battery charger unit. Sufficient flexible conduit shall be provided above the rack to permit interconnection to chargers located at the bottom of the rack.

10.2.4 DC wiring for the radio network's battery plant and interconnection to the various equipment groupings shall be furnished and installed, as required.

10.2.5 Two 240VAC electrical circuits shall be provided for the HVAC system. Sizing of these circuits shall be determined by the Proposer.

10.2.6 Install six quad 120VAC convenience outlets, two each on the two longest walls and one each on each of the remaining walls. A total of three 15-ampere circuit breakers shall be provided (two quads per breaker).

10.2.7 Furnish and install a 120/240VAC automatic generator transfer switch and LPG generator set, per Section 9.2, Generator Equipment Requirements. All circuits and outlets for all equipment installed in the shelter shall be on the Emergency power system

10.2.8 The Contractor shall furnish and install one circuit breaker panel board. Panel board shall be sized for all of the indicated branch circuits, equipment loads plus a fifty percent growth factor.

10.2.9 The Contractor shall furnish and install an interior and buried exterior electrical grounding system and power surge protection for each location, as follows:

A. A single No. 2AWG copper conductor ground halo shall be installed on all four interior walls, spaced approximately six-inches below ceiling level. The halo shall include a twelve-inch gap/break at the furthest point from the single-point ground attachment, which shall coincide with the RF transmission line entrance.

B. Ground halo shall be mounted on six-inch standoffs, located on twelve-inch centers. It shall be affixed to the transmission line ground entry-port buss bar.

C. All equipment cabinets, racks, transmission line entrance and cable trays shall be individually bonded to the halo using No. 6AWG copper conductors with approved compression fittings.

D. Interior halo shall be bonded to an exterior, buried ground network using low impedance copper conductors.

E. Electrical transient protector shall utilize MOV and avalanche clamp devices such as the Transtector Systems Model 1101-610 or equal. These devices shall be installed on the commercial power feed as well as the standby generator feed to the power transfer switch.

E. A single, stranded No. 00AWG copper exterior ground system shall be installed about the building and tower perimeter, located approximately 30" below grade and exothermically bonded to the building frame, interior halo, transmission line ladder, generator system and radio tower legs. All site grounding practices and methods shall meet a recognized telecommunications standard such as IEEE, Motorola R 56 or Harris AE/LZT 123 46181/1 Rev D.

10.2.10 Install 4-foot, 2-bulb, 80-watt fluorescent light fixtures as necessary to provide effective illumination for each equipment cabinet. Emergency exit and inter lighting as required by fire code. Exterior lights above the door and area lights on each of the exterior shelter corners shall be controlled by at a maximum of two light switches located just inside the door opening on the side away from the hinges at shoulder height.

## 10.3 HVAC Requirements

10.3.1 The Contractor shall furnish and install a dual, wall-mounted heating and air-conditioning system appropriately sized for each shelter/equipment heat load. Each HVAC unit shall incorporate circuitry to ensure that both compressors do not attempt to restart at the same time. There shall be timer circuits to rotate use of the air conditioner units on a weekly basis. Additionally, sensors may cause both air conditions to run simultaneously as needed to reduce the internal temperature to a safe operating level.

10.3.2 Equipment shall be furnished with compressor anti-cycle circuitry to prevent short-cycle starts against high compressor head pressure.

10.3.3 Equipment shall be furnished with a compressor hot gas bypass to minimize electrical power surges because of compressor cycling.

10.3.4 Design of HVAC system shall take into consideration the following environmental conditions:

| | |
|---|---|
| Desired Interior Temperature: | 72 degrees F |
| Maximum Outdoor Temperature: | 115 degrees F |
| Minimum Outdoor Temperature: | 10 degrees F |
| Transmitter Power Dissipation: | 12,000 watts |
| System Controller: | 850 watts |
| Battery Charger/Inverter: | 4,000 watts |
| Lighting: | 750 watts (Intermittent) |

10.3.5 Buildings shall incorporate a thermostatically controlled fan system designed to operate in the event of a total HVAC failure and where the building's interior temperature exceeds 90°F. This system shall incorporate appropriate dampers, screens and filters to limit dust and insect entry into the building.

### 10.4 Alarm Systems

10.4.1 The Contractor shall furnish and install an over/under temperature sensor, continuously adjustable over the range of 30°F to 90°F, having independent Form-C output contacts suitable for high/low temperature alarm activation.

10.4.2 The Contractor shall furnish and install a door entry alarm sensor, magnetic type, having a Form-C contact closure output.

10.4.3 The Contractor shall furnish and install a single-loop smoke/ fire alarm system.

10.4.4 Smoke/fire alarm sensors shall be mounted above battery charger equipment, and in vicinity of AC power distribution panel board.

10.4.5 Smoke/fire alarm panel shall have visual indicators depicting individual alarm sensor status.

10.4.6 Smoke/fire alarm panel shall operate from both 120VAC and 12VDC battery power sources.

10.4.7 All shelters shall be equipped with an inert gas fire suppression system (FM 200 or similar) that is environmentally approved and not injurious

to communications personnel. The system shall be connected to the communications and shelter fire/ smoke system alarms. Trigger of the system causing a gas discharge shall cause the air conditioners to automatically shut off. The air conditioner units must be manually restarted to purge the shelter of the gas, after all evidence of combustion is resolved. All necessary plumbing and overhead dispersal equipment shall be provided.

The fire suppression system shall have modes for test and maintenance that do not trigger activation. The system shall be installed and delivered with a primary tank, on line and a spare, full tank, off line. In the event of a discharge during testing by the vendor, the City/County shall not be responsible for replacement or refill of the system. Refill of the system primary tank, by the Contractor, due to an actual event, the spare tank shall be placed in line and the discharged tank shall be refilled and returned as the spare within 48 hours by the vendor. The Contractor must have a representative within 50 miles who must respond within two hours of a discharge or system failure.

## 10.5 Tower Requirements

10.5.1 The basic standard for the design of newly required steel antenna towers, wave guide bridges and supporting structures, shall be ANSI/EIA-222G or latest version.

10.5.2 Towers shall be either a self-supporting or guyed triangular shaped, solid-rod structure having an overall height to be determined by the Proposer, based on the requirements of area coverage and availability of unobstructed microwave paths for site connectivity. Limits of

available space in certain areas may dictate the use of self-support towers.

10.5.3 Each tower shall be designed for a minimum sustained 150-mph wind speed, 1" of radial ice, and with the full complement of necessary antennas, required lights and any other Federally-required equipment. Proposals must take into consideration any current antennas that must be retained by the City/County for other communications needs.

10.5.4 Antenna loads shall be as determined by Proposer; however, the design shall include a minimum 50% growth factor.

10.5.5 All fabricated tower assemblies and parts shall be hot-dipped galvanized after fabrication per ASTM Standard A123. Hardware shall be galvanized per ASTM Standard A153 and B695. Other types of zinc coating or plating are not acceptable.

10.5.6 Towers shall be supplied with a full-length transmission line ladder(s) designed to accept all transmission lines needed for the proposed design plus a 100% growth factor.

10.5.7 Towers shall be equipped with an outside climbing ladder/cable type safety device and strobe-lighted in accordance with FAA and current OSHA regulation 29 CFR §1910.27. This device shall not interfere with the ease of climbing from one rung of the ladder to the next. There must be at least two sources of climbing safety belts compatible with the safety climb anti fall system, as supplied with the tower. Tower lighting shall conform to FAA Advisory Circular AC 70/7460-1K, or current revision. Obstruction Marking and Lighting. It is imperative

that only properly shielded, RFI-conditioned lighting devices be provided. Proposer shall provide detailed lighting equipment specification literature in its proposal package sufficient in scope where the Consultant can determine the suitability of the proposed lighting system with respect to planned or anticipated VHF/UHF operations.

Lighting system controls shall be installed on a temporary fixture adjacent to the tower, operate on a photocell and provide a Form-C contact to the alarm panel. (Note: This controller device is to be relocated within the site's equipment shelter once fully constructed. Please factor sufficient additional lighting control cable into the installation to allow the control to be relocated.) Strobe in daylight, beacon at night is the required operational mode.

10.5.8 Antennas, tower top pre-amps and transmission lines as specified by the licensed frequencies and Contractor's system design, shall be provided and installed by the Contractor.

10.5.9 A site's Electrical Grounding System shall be furnished and installed by the Contractor in accordance with the following minimum practices:

- Install a ground ring around the base of the tower, consisting of 10'x 5/8" ground rods driven to a depth necessary to meet the required resistance measurement of the specifications, adjacent to the foundation of the tower at each leg. Ground rods are to be interconnected by a minimum #00AWG stranded copper wire, which is to be exothermically welded to the top of each ground rod. Copper wire and ground rods are to be installed in a trench of a minimum

depth of 30-inches below finished grade or local frost line. Maximum spacing between rods shall be 20-feet.

- Each tower leg shall be bonded to the ground ring using #00 stranded tinned copper cable, which has been exothermically welded to a flat, 4-inch square solid steel tab located near the base of each tower leg. Each cable lead will run to the closest ground rod through an insulated sleeve to minimize wire damage. The upper end of the sleeve should be sealed with a non-shrinking compound such as RTV to prevent water from collecting within the sleeve. The Contractor shall avoid making any acute bends as the ground wire transitions from the foundation. Bends should be a minimum of 9 inches in radius. To complete the exothermic welding process, the attachment area on the tower tab shall be cleaned and coated with a cold galvanizing compound.

- A tower-mounted lower ground bar, to be located approximately two feet above the ice bridge, will be supplied with a # 2/0 ground wire lead that is extended and exothermically welded to the tower ground ring. The wire lead must be sleeved so that it is protected from physical damage. Like above, the upper end of the sleeve shall be sealed with a non-shrinking compound like RTV to prevent water from entering and collecting within the sleeve. This ground wire lead shall be installed at the time the tower ground ring is installed.

- The ground rod/ring system shall extend around the perimeter of the equipment shelter, transmission line copper entrance port into the shelter and to the perimeter fence. Ground system ring around the tower base shall be located a minimum of 36 inches away from the

tower foundation. The tower ground system ring shall be connected to the equipment shelter ground ring in at least 2 places, on the closest corners of the shelter ring.

- The Contractor shall electrically bond all transmission line outer shields to the structure at the top of the tower immediately below the antenna and at the line midpoint if the tower's height is over 200-feet. Likewise, bond all transmission line shields near the bottom segment of the tower, approximately one-foot above the bend made to enter the waveguide bridge and again at the shelter's antenna entry port/panel. Use only transmission line grounding kits approved by the manufacturer for use on the type and diameter of transmission lines provided. All installed grounding kits shall be appropriately weather sealed.

- Fencing shall be grounded to the ground ring via #2AWG solid copper wires, bonded via exothermic welding at each fence post. All exothermic welds shall be cleaned and protected with a minimum two coats of cold galvanize material.

- The shelter's interior halo ground and transmission line copper inside entrance port (buss bar) shall be exothermically bonded to the outdoor ground system.

- A ground test well shall be provided at a minimum of two locations along the ground loop. One test well shall be located adjacent to the tower and the other at the far side of the equipment shelter loop. Each test well shall consist of a minimum 6-inch diameter PVC material that extends down to the depth of two feet and shall allow

the attachment of a test wire to measure ground resistance. A screw on or drop on cover that is easily removable to allow testing shall be provided.

- Grounding system resistance shall be measured to be 3-ohms or less between any point on the ground system and earth ground. Measurement shall be done with a 4-point ground resistance tester and not by a clamp on resistance tester.

### 10.6 Guy Wires

Galvanized guy strand shall conform to the minimum requirements of ASTM Standard A475 Extra High Strength (EHS) or equivalent recognized standard.

Preformed guy grips and dead-ends shall be designed specifically for the length, size and type of cable being used. This shall include the size, number, and lay of the wires and electrochemical compatibility of the material. An adequate bend radius shall be provided, as per the manufacturer's recommendations, at the inside of cable attachments consisting of a thimble.

Shackles used to connect guy assemblies shall be forged from AISI grade 1035 or 1045 steel or equivalent and suitably heat-treated (quenched and tempered, normalized or annealed).

Take-up devices shall be installed at the anchor end of the guy assembly for adjusting the guy tension. In initial installations, the minimum take-up adjustment available after the structure is plumb and

the guy tensions are set shall be 6 inches for guys with normal diameter of 0.5 inches and 10 inches for guys with normal diameter greater than 0.5 inches.

All guy wires shall be bonded to ground rods using, minimally, a # 2 AWG solid, tinned copper wire. Bonding shall include use of guy wire grounding clamps that are tin-plated bronze (or similar type material) to prevent electrolysis. Grounding attachment clamps shall be installed above the guy wire turnbuckle.

Guy wire anchor plates are to be grounded using, minimally, a # 2 AWG solid, tinned copper wire that is exothermically welded to the anchor plate. Welds shall to be cleaned and treated with cold galvanized coatings to prevent rusting.

## 10.7 Required Tower Submittals

10.7.1 The Contractor shall furnish wind-load stress and foundation calculations used in the design of the proposed tower structure.

10.7.2 The Contractor shall furnish documentation approved by a registered professional engineer, licensed in the State of Kansas, certifying that the proposed tower and foundation meets the requirements of ANSI/EIA-222G or latest version and is in accordance with these Specifications.

10.7.3 Prior to proposal submission, Proposers shall, at their own expense, make such additional investigations on site conditions, as necessary, for the successful and accurate completion of their Proposal Submittal.

The City/County shall permit site inspection access during normal business hours with an escort from the City/County or designee.

10.7.4 Proposers shall furnish documentation as to any special condition or restriction applied to the use of materials, products or equipment contained in their Proposal. Contractor shall provide to the City/County a minimum of two sets of completed as-builts on each tower and shelter installed in this project. This shall include engineering and design document from the tower and shelter manufacturer. Installed structural members or welded structural assemblies, except for standard hardware, shall have a part number. The part numbers shall correspond with the Contractor's assembly drawings. Part numbers are to be permanently attached (stamped, welded lettering, stamped on a plate that is welded to the member, etc.) to the member before all protective coatings are applied. Attached/affixed part numbers shall have a minimum character height of 0.50 inches.

10.7.5 The Contractor shall furnish written certification that all installed tower components have been assembled and hot-dipped galvanized in accordance with these minimum requirements.

10.7.6 The Contractor shall provide a detailed report of electrical ground resistance measurements of the completed, as-installed, electrical grounding system, on a per-site basis with field drawings to indicate the measurement at a specific location.

## 11.0 SITE WORK REQUIREMENTS

### 11.1 Site Preparation and Sub-grading

#### 11.1.1 General

Site clearing, initial earthwork and rough grading and final grading as needed for installation of towers and equipment shelters is the responsibility of the Contractor. The following describes a set of minimum requirements for the execution and completion of site-related construction activities.

#### 11.1.2 Performance

1. Dewatering:

    a. Control grading around excavations to prevent surface water from flowing into excavation areas;

    b. Drain or pump as required thereby maintaining all excavations, trenches and pier holes free of water from any source and discharge to approved drains or channels. Commence dewatering action when water first appears and continue until work is complete to the extent that no damage will result from hydrostatic pressure, flotation, or other causes;

    c. Use pumps of adequate capacity to insure rapid drainage of area, and construct and use drainage channels and sub-drains with sumps, as required;

    d. Remove unsuitable excessively wet sub-grade materials and replace with approved backfill material;

2. Compaction:

a. Compact sub-grades, fills, embankments and backfills using spreading equipment, tamping rollers, rubber-tired rollers, vibratory compactors, or power tampers, as required to obtain reasonable uniformity. Nuclear soil testing results are required to be provided in a report to the Consultant;

b. Perform within moisture content range as specified to obtain required results with equipment used;

c. Achieve minimum densities specified as references to:

1. Cohesive soils - 95 percent maximum density at optimum moisture, AASHTO T99.

2. Cohesionless Soils – 70 percent of maximum relative density.

a) ASTM, STP 479 Bunnister method;

b) USBR - E12 relative density;

c) Relative density, ASTM D2049.

3. Cohesionless Soils

a) The City/County or designee may approve the use of AASHTO T99 for certain cohesionless soils using at least 100 percent of maximum density.

4. Compact control fill and backfill in not over 8-inch lifts per layers and compact to between 90 % to no more than 96 % of maximum density at optimum moisture AASHTO T99.

## 11.2 Drilled Pier Foundations

### 11.2.1 General

1. Extent of Work:

   a. Perform all drilling and excavation and supply all labor and materials to construct drilled pier foundations, as necessary.

### 11.2.2 Performance

1. Quality Assurance:

   a. Field Inspection by the City/County's designee - quality control.

      1. The City/County's Project Representative will be designated to be responsible for field inspection of the drilled pier foundations. He will transmit, in writing, to consultant and Contractor any materials or methods observed by him, which do not conform to this specification and, if required, will not be considered for payment. The City/County's Project Representative must inspect each drilled pier. Specific responsibilities of the City/County's Project Representative will be to:

a) Observe drilling excavation of drilled pier foundations. Ensure the placement of anti-caving physical barriers or the use of special drilling mud to prevent excessive cavitation;

b) Inspect material and equipment used in construction of drilled piers;

c) Inspect bearing elevation of drilled piers.

d) Observe placement of concrete and rebar within the drilled pier foundation to match design specification. Ensure that no excessive earth contamination occurs. Contamination of poured concrete is sufficient to cancel the pour and request engineering inspection.

e) The City/County's representative shall photograph or film all foundation excavation and pouring activities.

2. Contractor Qualifications

a. A minimum of two-year's experience in drilled pier construction, including experience with similar subsurface material, water conditions, shaft sizes, and special techniques as required.

3. Drilled Pier Details

a. Drilled shaft dimensions and top elevations shall be in accordance with foundation design calculations and drawings;

b. The drilled shaft bearing or bottom elevation shall be at the elevation indicated, unless it is determined by the City/County that the bearing elevation should be adjusted.

4. Drilled Pier Excavation

a. Excavate drilled shaft to dimensions and required elevations as indicated. Maintain sidewall stability during drilling and extend excavation to suitable material.

b. Determine suitability of supporting material for drilled piers as follows:

1) Inspection of each pier will be by the City/County's Project Representative and Contractor.

c. Remove from bottom of drilled piers, loose material or free water in quantities sufficient to cause settlement or affect concrete strength as determined by the City/County;

d. Install temporary casing, where required, to prevent caving of drilled pier sides or excessive seepage;

e. Dewater all drilled pier excavations prior to cleaning, inspection, and placing concrete;

f. Each drilled pier must be inspected and approved by the City/County's Project Representative before any concrete may be placed.

5. Excavated Material

a. Dispose of any excavated material at locations approved for that purpose.

6. Reinforcing Steel

a. Place reinforcement for drilled piers in accordance with foundation design documents;

b. Place bars as shown on foundation drawings with concrete cover of not less than 3-inches where exposed to soil;

c. A reinforcing cage shall be designed as a structural element and braced to retain its configuration throughout the placing of concrete and the extraction of the casing (if used) from the shaft.

7. Concreting

a. Dewater drilled piers and maintain the excavation free of water prior to placing concrete;

b. Place concrete immediately after final inspection;

c. Place concrete immediately after completion of excavation and after the City/County's Project

Representative has completed his inspection. Do not leave uncased excavations open over night;

d. Free fall concrete (not over 6') may be used provided it is directed through a hopper, or equivalent; such that fall is vertical down center of shaft without hitting sides. Vibrate concrete, but only after casing, if used, has been pulled;

e. Place concrete in pier in one continuous pour operation from bottom to top;

f. The City/County's Project Representative will provide inspection during the removal of casing and placing of concrete. Withdraw casing, if used, only as shaft is filled with concrete. Maintain adequate head of concrete to balance outside soil and water pressure above the bottom of the casing at all times during withdrawal. Specific procedures that the Contractor will follow to accomplish this objective shall be submitted for approval;

g. Where casing is removed, provide specifically designed concrete with a minimum slump of 5-inches and with a retarder to prevent arching of concrete (during casing pulling) or setting concrete until after casing is pulled. Check concrete level prior to, during, and after pulling casing. Pull casing before slump decreases below 5-inches as determined by testing;

h. During casing extraction, upward movement of the reinforcing steel shall not be permitted. Downward movement should not exceed 2-inches per shaft length;

i. Remove all water and concrete contaminated with soil, or water before resuming concrete placement;

j. Center reinforcing cages in the drilled pier excavation and suspend them in an approved manner prior to placement of concrete to the cutoff elevation;

k. Leave forms on pier for a period of three days;

l. Set anchor bolts to the manufacturer's required tolerances, using substantial templates or other approved method.

## 11.3 Concrete, Forms and Reinforcement

### 11.3.1 General

1. This Specification includes concrete, forms, and steel reinforcement as used for:

   a. Drilled pier foundations with square caps for steel structures;

   b. Concrete pads for transformers and breakers;

   c. Equipment shelter and tower foundations;

   d. Cable trench.

2. Quality Assurance

a. Applicable Standards:

1) American Concrete Institute (ACI)

a) ACI 304 - Recommend Practice for Measuring, Mixing, and Placing Concrete.

b) ACI 305 - Committee Report on Hot-Weather Concreting.

c) ACI 306 - Committee Report on Cold-Weather Concreting.

d) ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures.

e) ACI 318 - Building Code Requirements for Reinforced Concrete.

2) American National Standards Institute (ANSI)

a) B 1 8.2.1 - Square and Hex Bolts and Screws, Including Askew Head Bolts, Hex Screws, and Lag Screws.

b) B 1 8.2.2 - Square and Hex nuts.

3) American Society for Testing and Materials (ASTM)

a) A36 - Structural Steel.

b) A82 - Cold-Drawn Wire.

c) AI 85 - Welded Steel Wire Fabric for Concrete Reinforcement.

d) A307 - Low-Carbon Steel Externally and Internally Threaded Standard Fasteners.

e) A615 - Deformed Billet Steel Bars for Concrete Reinforcement.

f) C31 - Making and Curing Concrete Compression and Flexure Test Specimens in the Field.

g) C33 - Concrete Aggregates.

h) C39 - Compressive Strength of Cylindrical Concrete Specimens.

i) C94 - Ready-Mixed Concrete.

j) C 143 - Slump of Portland Cement Concrete.

k) C 150 - Portland Cement.

m) C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

n) C494 - Chemical Admixtures for Concrete.

4) Midwest Concrete Industry Board (MCIB)

### 11.3.2 Equipment and Materials

1. Concrete Materials:

   a. Cement

      1) Conform to ASTM C 150. Portland cement Type 1.

   b. Water

      1) Water shall be clean and free from injuries amounts of oil, acids, alkaline, or other deleterious substances. Any potable drinking water will be acceptable.

   c. Fine Aggregates

      1) Clean natural sand. Manufactured sand may be used upon written approval of the City/County's designee. Conform to ASTM C33.

   d. Coarse Aggregates

      1) Clean crushed stone or processed gravel, not containing organic materials. Conform to ASTM C33.

   e. Air Entertainment

      1) 4-6 percent air shall be used in all concrete.

   f. Water Reducing Admixture

      1) Conform to ASTM C494, Type A.

2. Concrete Mix

   a. Ready-mixed Concrete

      1) Concrete shall meet requirements of ASTM C94, and of materials and proportions specified;

      2) Ready-mixed concrete plant shall be subject to approval of the City/County's Project Representative.

3. Forms

   a. Form materials; use one of the following:

      1) Exterior grade plywood 5/8 inch thick.

      2) Approved wood fiberboard.

      3) Dressed lumber, free of loose knots.

      4) Approved preformed economy forms.

      5) Forming materials may be treated with approved form oil for ease of form removal.

   b. Form Ties

      1) Approved break-back type.

4. Steel Reinforcement

a. Reinforcement Bars

1) Conform to ASTM A615, Grade 60 for all bars No.4 or larger.

b. Tie and-All No.3 Bars

1) Conform to ASTM A615, Grade 40.

c. Welded Wire Fabric

1) Conform to ASTM A185, using bright basic wire conforming to ASTM A82. Wire gauge No. 11 or smaller shall be galvanized.

5. Grout

Use unshrink, easy flow type grout as approved by the City/County's Project Representative.

6. Anchor Bolts

a. Provide all anchor bolts required for complete installation;

b. Anchor bolts and accessories shall conform to ASTM A307 using A36 steel;

c. Use hexagonal bolts and nuts conforming to ANSI B 1 8.2.1 and B 1 8.2.2;

d. All exposed area of anchor bolts and nuts, plus a minimum of three inches of embedded area, shall be hot-dipped galvanized;

e. Install as indicated on foundation drawings.

### 11.3.3 Performance

1. Field Testing

   a. Field testing of concrete and making of concrete test cylinders will be performed by an independent testing laboratory approved by the City/County's Permit Department.

   b. Laboratory Testing

      1) Laboratory for testing shall be selected and paid by the City/County;

      2) Laboratory will furnish cylinder molds with cap seals or adequate means of identification;

      3) Cylinders shall be tested conforming to ASTM C39. Average strength of two test cylinders (at 28 days) shall be used as result of the test. Break one test cylinder after 7-days curing, one after 14-days, and two after 28-days;

      4) Results shall be provided to the Project Representative in a formal report. A copy shall be provided to the Consultant and Contractor.

2. Low Strength Concrete

   a. Defined as concrete whose 7-day and 14-day test (average of 2 cylinders) is less than 70% and 85%, respectively, of the specified minimum 28-day compressive strength.

If concrete does not meet the 4000lb. test in twenty-eight days, the Contractor shall pay for the cost of the core test.

b. Disposition of Concrete

1) Concrete shall remain accessible with no other work performed that relates to or depends upon the questionable concrete until a formal decision as to the disposition of the concrete is given by the City/County's Project Representative.

2) Low strength concrete shall be removed and replaced if so requested by the City/County's designee.

3. Placing of Concrete

a. Preparation

1) Clean bonding surfaces free from laitance and foreign materials;

2) Place concrete on property prepared and unfrozen sub grade and only in dewatered excavations;

3) Do not deposit partially hardened concrete or concrete contaminated by foreign materials.

b. Placing Concrete

1) Conform to ACI 304.

2) Place within 60 minutes after mixing, except the City/County's designee may extend the period to 90 minutes (maximum) dependent upon weather conditions;

3) Place in horizontal layers not exceeding 18-inches;

4) Vibrate concrete to produce solid mass without honeycomb or surface air bubbles.

c. Curing Concrete

1) Cure with liquid membrane-forming compound conforming to ASTM C309, Type I. Apply per manufacturer's recommendations;

2) Apply curing compound to all exposed surfaces immediately after removing form or after finishing concrete;

3) Keep formwork wet until stripped.

d. Cold Weather Placing

1) Conform to the practice recommended in ACI 306 when the temperature is below 40-degrees F or is likely to fall below 40-degrees F during a twenty-four hour period after placing;

2) Protect pier caps and other concrete from freezing using insulating blankets.

e. Hot Weather Placing

1) Conform to practices recommended in ACI 305 when temperature is 90-degrees Fahrenheit or above or is likely to rise above 90-degrees Fahrenheit within a twenty-four hour period after placing.

4. Construction Joints

a. Locate where indicated. Conform to AC 318.

b. Clean and break laitance or other foreign material from bonding surface. Bed with 1-inch of grout for bonding in horizontal joints.

5. Surface Finishes

a. Float Finish

1) Compact, accurately screed, and wood float all slabs to a true uniform surface;

2) Test surface with straightedge and eliminate high and low spots of more than 1/8 inch in ten feet;

3) Use this finish in addition to the finishes specified below for all surfaces as indicated;

4) Use a final finish for footing slabs not exposed.

b. Hand-troweled Finish

1) Finish surface as in Float Finish and in addition, trowel and steel trowel to obtain a smooth dense finish after concrete has hardened to ring under the trowel.

2) Use this finish on all floors, slabs, and equipment bases not specifically designated for a different finish.

c. Broom Finish

1) Finish surface as in Float Finish and, in addition, draw a stiff bristled broom across the previously floated surface.

2) Corrugations shall be uniform in appearance, not more than 1/16-inch in depth and shall be perpendicular to direction of traffic.

3) Use this finish on all outdoor slabs subject to vehicular or pedestrian traffic and areas to receive grout.

d. Burlap Finish

1) Apply burlap surface treatment to exposed edges of slabs, curbs and foundations;

2) Wet and fill all voids using mortar with the same sand-cement ratio as original concrete. Use approximately 20 percent white cement to match concrete color;

3) Strike off all excess mortar flush with the surface using a burlap or canvas cloth with a circular motion;

4) Remove all rough spots and rub with cloth to leave a surface of uniform texture and appearance;

5) Finish shall result in a coating of mortar that will fill all small voids and air holes leaving a smooth surface;

6) Cure as specified under Curing Concrete.

6. Defective Surface Treatments

a. After removal of forms, remove all fins, projections and form ties.

b. Grout and cure all voids, damaged areas, and tie holes.

7. Forms

a. Treat forms with an approved oil or lacquer prior to placing reinforcement;

b. Wet forms with clean, clear water prior to placing concrete;

c. Adequately brace and stiffen forms to prevent deflection and settlement.

8. Steel Reinforcement

a. Place accurately, tie at intersection, and support on chairs. Conform to ACI 318;

b. Tie securely with 16 gauge or larger annealed iron wire;

c. Splice steel not less than 30 bar-diameters for A615, Grade 40, and 42 bar-diameters for A615, Grade 60, unless otherwise indicated;

d. Splice plain bars not less than twice that for deformed bars;

e. Lap welded wire fabric not less than the length of one mesh;

f. No.3 bars to be Grade 40, with all others to be Grade 60;

g. Provide ¾-inch chamfer for all exposed edges of concrete, vertical and horizontal.

## 11.4 Fences and Gates (Chain-Link Security Type)

### 11.4.1 General

1. Description

a. This section covers chain-link fabric fence and gates.

2. Quality Assurance

a. Applicable Standards

1) Federal Specifications (FS)

a) FF-BO-575 - Bolts, hexagon and square.

b) RR-F-191 - Fencing, wire and post, metal and gates, chain-link fence fabric, chain-link and accessories.

c) RR-F-221 - Fencing, wire, barbed wire, woven-wire and netting, fence post and accessories.

### 11.4.2 Requirements

a. Manufacturer's standard materials where such materials conform to these Specifications or have been approved by the City/County.

b. Conform to FS RR-F-191 except as indicated or specified otherwise.

c. Fence height – 8 ft. high galvanized chain link with 3-strand barbed wire at top (9½ feet overall height).

d. Gate widths as indicated on layout drawings.

e. Finish for framework and appurtenances (excluding fabric) – Galvanized with minimum weight for zinc per square foot as follows:

1) Pipe – 1.8 ounces.

2) Hardware and accessories – conform to FS RR-F-191.

3) Barbed wire – 0.80 ounce.

f. Finish for fabric

1) Galvanized per ASTM A392, Class-2 with 1.8-ounce, minimum weight, for zinc per square foot or;

2) Aluminum coated per ASTM A491, Class-2 with 0.40-ounce, minimum weight, for aluminum per square foot.

g. All fence and gates to have 3-strand barbed wire at top.

h. All materials furnished shall comply with the above requirements.

### 11.4.3 Fabric

a. No.9 gauge, 2-inch diamond mesh chain-link fabric.

b. Top and bottom selvage twisted and barbed.

c. Fabric fastenings of 9-gauge galvanized wire ties.

### 11.4.4 Posts, Top Rail and Braces

a. Posts

1) End, angle, corner or pull posts – 3-inches O.D. at 5.79 pounds per foot.

2) Line posts – 2.5-inches O.D. at 3.65 pounds per foot.

3) Gate posts – 4.0-inches O.D. at 9.10 pounds per foot.

b. Top rail

1) 1.625-inch O.D. standard weight steel pipe.

2) 18-foot minimum length of each section.

3) Expansion type coupling for each joint.

c. Post bracing

1) Diagonal truss rods 3/8 inch in diameter equipped with truss tightened.

2) Horizontal braces – 1.660-inch O.D. at 2.27 pounds per foot.

d. Post tops

1) Designed as a weather tight closure cap for tubular posts.

2) Malleable iron or pressed steel.

e. Barbed wire supporting arms

1) Single arm at 45-degrees with vertical, sloping to outside of fence;

2) Constructed for attaching three rows of barbed wire to each arm and designed as a weather tight closure cap for tubular posts;

3) Designed for 200-pound minimum pull down load;

4) Attached to steel posts or integral with post top;

6) Provided with openings to receive top rail;

6) Malleable iron or pressed steel.

f. Stretcher bars

1) One piece, full height of fabric.

2) 3/6 inch x ¾ inch, galvanized;

3) Bands of galvanized steel or malleable iron.

g. Bolts

1) Zinc coated.

2) Conform to FS FF-B-575.

### 11.4.5 Barbed Wire

a. Two-strand, l2½ gauge wire with 4-point barbs 5 inches O.C.

b. Conform to FS RR-F-221, Type 1, Style 2;

c. Three rows required on all fence and gates.

### 11.4.6 Gates

a. Framing

1) Frames of tubular members, 2-inch O.D. at 2.72 pounds per foot;

2) Intermediate horizontal and vertical members for proper gate operation and for attachment of fabric, hardware and accessories;

3) Frames assembled by welding or watertight galvanized steel rigid fittings;

4) Diagonal cross bracing of 3/8 inch diameter adjustable truss rods to provide frame rigidity;

5) Gate end members extended one foot above top members to receive three rows of barbed wire;

b. Hardware

1) Hinges of pressed or forged steel, or malleable iron, non-lift-off type, 1 1.2 pair per leaf.

2) Latches and gate stops – double leaf.

a) Plunger-bar type latch, full gate height, designed to engage gate stop of flush-plate type with anchors;

b) Locking device and padlock eyes an integral part of latch;

c) Keeper to automatically engage gate leaf and secure free end of gate in full 90-degrees open position.

3) Latches – single leaf

a) Forked type to permit operation from either side of gate.

b) Padlock eye as integral part of latch.

### 11.4.7 Performance

1. Installation

a. Fence

1) Follow general contour of ground and properly align

2) Posts

   a) Set in concrete retaining wall. Trowel finish tops of footings and dome to direct water away from posts;

   b) Install plumb and in straight alignment;

   c) Space ten feet center-to-center, maximum;

   d) Temporarily brace until concrete in bases has set.

3) Post Bracing

   a) Install at each end and gatepost, and on each side of comer posts;

   b) Install after concrete in post bases has set;

   c) Install so posts are plumb when diagonal rod is under tension.

4) Top Rails

   a) Run continuously through post caps or barbed wire supporting arms.

   b) Install expansion coupling at each joint.

5) Tension Wire

a) Weave through the fabric and tie to each post with minimum 6-gauge galvanized wire.

6) Fabric

a) Stretch taut with equal tension on each side of line posts;

b) Fasten to top rail and steel posts with wire ties;

c) Space wire ties at 12-inches O.C. maximum on posts and at 24-inches O.C. maximum on top rail.

7) Stretcher Bars

a) Thread through or clamp to fabric 4-inches on center (O.C.);

b) Secure to posts with metal bands spaced 15-inches O.C. maximum;

c) Install at each gate, pull and end post, and each side of comer post.

8) Barbed Wire

a) Attach three rows to each barbed wire supporting arm. Pull wire taut and fasten securely to each arm;

b) Install four rows above fabric and on extended gate end members of gates.

b. Gates

1) Install plumb, level, and free swinging through full opening without interference;

2) Install all hardware, including keepers, ground set items and flush plate in concrete to engage gate stop;

3) Furnish and install gate alarms;

4) Adjust and lubricate as necessary for smooth operation.

c. Repairing Damaged Coatings

1) Repair any damaged coating in the shop or field by recoating with compatible and similar coating.

2) Apply per manufacturer's recommendations.

d. Danger Signs

1) Furnish and install signs as approved by the City/County's designee.

Note: All fencing at any site must be exothermically bonded to the site's electrical grounding system. All major posts, gates and fabric must be integrated into this bonding scheme. All locations of exothermic bonding must be properly treated by recoating with a compatible and similar coating to prevent corrosion.

## 11.5 Crushed Rock Surface

### 11.5.1 General

1. Description

   a. This section includes crushed rock surface and method of depositing for the placement of permanent crushed rock surfacing in equipment shelter areas.

   b. Related work specified elsewhere

      1) Site preparation and earthwork – Section 10.1

      2) Herbicide application – Section 10.6

2. Quality Assurance

   a. Applicable Standards

      1) American Society for Testing and Materials

         a) C117– Test for Materials Finer than No. 200 Sieve in Mineral Aggregate by Washing.

         b) C131– Test for Abrasion of Coarse Aggregates by Use of Los Angeles Machine.

         c) C136 – Test for Sieve or Screen Analysis of Fine and Coarse Aggregates.

         d) D423 – Test for Liquid Limit of Soils.

e) D4242–Test for Plastic Limit and Plasticity Index of Soils.

f) D75 – Sampling Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials.

2) American Association of State Highway and Transportation Officials (AASHTO)

a) T99–Test for the Moisture Density Relations of Soils Using a 5.5-Pound Rammer and a 12-Inch Drop.

b) Samples and Testing

1) Test to determine conformance with all requirements for material quality and properties specified herein will be performed by an independent laboratory approved by the City/County and compensated by the Contractor.

2) Obtain representative samples of material in accordance with ASTM D75 for testing. Furnish the City/County's designee sufficient materials for testing from each sample at the time obtained.

3) Furnish specific schedule for sampling to provide the City/County's designee the opportunity to observe sampling.

4) Quality control testing will be performed during construction by a testing laboratory retained by the City/County.

3. Submittals

1. Includes, but not limited to, the following:

a) Test result reports from testing laboratory indicating conformance with the specifications.

b) Certification of conformance with the specifications.

### 11.5.2 Equipment

1. General

a. Crushed rock surface shall consist of ¾" aggregate placed on top of a 6-mil polyvinyl.

2. Aggregate

a. Crushed limestone or crushed natural gravel, free from lumps or balls of clay or other objectionable matter, and reasonably free from thin and elongated pieces of dirt. Aggregates shall consist of angular fragments, durable and sound, and shall be reasonably uniform in density and quality.

### 11.5.3 Performance

1. General Requirements

a. Stockpiles

1) Only with approval of the City/County's designee in specified locations.

2) Clear and level storage sites prior to stockpiling.

3) Place in a manner and at locations designated by the City/County, providing separate stockpiles for materials from separate sources.

b. Preparation of sub-grade

1) Clean off all foreign substances;

2) Correct any ruts, depressions, or soft yielding spots and areas with inadequate compaction;

3) Treat all sub-grade areas with soil sterilant;

4) The City/County's Project Representative will inspect, prior to placing crushed rock surface, for adequate compaction and surface tolerances.

c. Grade control

1) Establish and maintain by means of grade stakes, properly spaced so string lines may be stretched between stakes.

2. Placing, Shaping and Compaction of Materials

a. Placing

1) Deposit and spread material in a uniform lift/layer and compact to the thickness indicated and as specified. Spread material uniformly on the prepared sub-grade from moving vehicles or spreader boxes;

2) Level material to the required contour and grades;

3) Remove those portions of the layer, which became segregated or mixed with sub-grade material in spreading and replace with new material as required by the City/County's designee;

4) Hauling which may damage the sub-grade or surfacing will be restricted by the City/County's designee;

5) Remove and repair sub-grade areas damaged during application of the crushed rock surface.

b. Shaping and Compacting Materials

1) Compact layers no less than 3-inches or more than 6-inches thick;

2) Roll to specified compaction requirements throughout full depth of layer with power rollers, rubber-tired rollers or combination;

3) Shape and smooth by blading and rolling with power roller, rubber-tired roller, or both;

4) Hand tamp in places not accessible to rolling equipment.

5) Degree of compaction shall be as follows:

a) Base compaction on weight per cubic foot of material passing ¾ inch sieve and compact to at least 100 percent of maximum density at optimum moisture.

b) Determine and control compaction in accordance with AASHTO T99.

6) Smoothness test shall be as follows:

a) Surface shall show no deviation in excess of 3/8 inch in any 10 feet when tested with a 10-foot straightened applied parallel with and at right angles to the center lines of the paved area.

b) Correct any deviation in excess of this amount of loosening, adding or removing material, reshaping, watering, and compacting as requested by the City/County's designee.

## 11.6 Herbicide Applications

### 11.6.1 General

1. Description

a. This Section includes a type of herbicide and method of placing on all areas to receive crushed rock surfacing prior to placing crushed rock.

Note: Herbicides may be only applied by an individual/firm certified in the manufacturer's recommended proper and safe application methods.

### 11.6.2 Equipment and Materials

1. Sprayers and applicators shall be suitable for intended use;

2. Mix herbicide per manufacture's recommendations;

3. Herbicide shall be Krover (1) as manufactured by DuPont, Inc., or approved equal;

4. Do not apply herbicide if it is too windy or where other adverse weather conditions exist.

5. Apply at a rate of 10 pounds of product per acre, or in accordance with manufacturer's recommendations.

### 11.6.3 Performance

1. Apply only after final sub-grade has been established.

2. Apply before installation of vegetation barrier cloth and placement of crushed rock.

2. Follow manufacturer's recommendations on timing of application with respect to weather and barrier/crushed rock placement.

## 12.0 INSTALLATION GUIDELINES

### 12.1 Engineering Drawings

12.1.1 Contractor shall furnish detailed block engineering drawings (i.e., Radio Network Drawings) for the radio network's compliment of base stations, servers, routers, switches, local and wide area network configuration(s), antenna/transmission line systems, interop gateways, base station interface gateways, and power systems at the Project Kick-Off Meeting. These drawings shall be updated **prior to installation** of each major portion of the system as follows:

A. Transmitter Site(s)

B. Receiver Site(s)

C. Site Antenna System(s)

D. Receiver Voter/Simulcast Control Point Equipment

E. System Controller/Server Equipment

F. Dispatcher Console Subsystem

G. Microwave Connectivity Subsystem

H. Radio/Microwave Alarm Subsystem

Submittal and the City/County's approval of these Contractor pre-installation documents is a mandatory requirement. Failure of the Contractor to provide this documentation prior to commencement of on-site equipment installation activities shall result in an unexcused project installation shutdown until all

required document submittals have been provided to the City/County and its Consultant and an approval notice has been released by the City/County.

12.1.2 Drawings shall, as a minimum, illustrate:

A. Relative cabinet/rack locations

B. Equipment power wiring (primary and emergency)

C. Equipment interconnection wiring (signal and control)

D. RF component interconnection details i.e. transmitter, combiner, antenna, etc.

E. Appropriate signal/voltage levels to facilitate alignment of level-sensitive components.

These drawings will serve as the basis for final as-built documents, which are described later in this Specification.

12.1.3 Civil drawings showing location details of equipment to be placed in existing or new facilities shall be provided by Contractor.

12.1.4 Contractor shall provide a comprehensive test record of alignment levels, antenna sweeps, programmable software settings, IP addressing and software versions installed within both infrastructure and user equipment as conducted as part of the Contract's Test and Acceptance Plan. The scope and detail of the comprehensive equipment test and acceptance plan shall be completed prior to Contract Execution with the Successful Proposer. Prior to commencement of acceptance testing procedures, the Contractor shall ensure that all installed equipment has been furnished with the latest software releases available for those equipment items/groupings.

12.1.5 Contractor shall supply true copies of Final Project Record Documents (sometimes referred to in the Industry as 'As-Built' drawings). These will include updated Radio Network engineering drawings, software releases descriptions, tower civils drawings, FCC-required tower and RF exposure studies, equipment service manuals and alignment details listed above, but amended to illustrate the network's final configuration at the time of acceptance by the City. The total number of document sets to be provided shall include one site-specific set for each infrastructure site and two comprehensive network sets for the Radio Maintenance Department's use.

**Final Project Record Documents must be submitted to the City/County's Project Representative within thirty days after system acceptance testing has been successfully concluded**. **Final payment for Contracted services shall not be released by the City/County until this documentation submittal has been successfully completed by the Contractor and approved by the City/County's Project Representative and Consultant.**

## 12.2 Workmanship

All workmanship shall be of the highest standard, in accordance with Industry-accepted practices and the National Electric Code. Work areas shall be maintained in a neat, orderly fashion. Work sites shall incorporate Contractor-provided trash containers and residue of the work shall be discarded as the work is underway.

The installation of audio, signal and control cables within equipment cabinets, enclosures, racks and cable trays must be properly routed such that wires/cables do not cross over each within cable bundles. Cables shall be permanently labeled with respect to origination/destination for either end. To the maximum extent possible, cables carrying AC power, low-level audio, RF and digital signals must be grouped separately.

All DC wiring, particularly those areas where battery terminals and power distribution bus bars are located, must incorporate insulation barriers to prevent the accidental short-circuiting of otherwise exposed conductors. Where multiple sets of the same equipment are configured for different sites, the cable management and cable dress shall be uniform, neatly arranged, maintain consistent color coding and shall be identically labelled for each site.

The City/County's Project Representative and Consultant shall have the ability to temporarily stop work progress by the Contractor if workmanship falls below acceptable levels and shall have the authority to require the Contractor to remove and/or correct all observed instances of poor wiring practice, inappropriate use of installation materials and other obvious installation defects as a result of apparent poor workmanship. Approval to resume installation work activities shall be provided to the Contractor once agreement is reached in resolving observed workmanship defects.

The determination of Contractor workmanship acceptability, as well as the suitability of any proposed rework plans offered by the Contractor, shall remain with the City/County's Project Representative and the Consultant.

## 13.0 PHASING - IMPLEMENTATION

### 13.1 Phasing of New Network

13.1.1 Contractor must prepare and submit a comprehensive migration plan that will prevent disruption of communication on the existing radio system(s) and provide a smooth transition to the new Project-25 digital voice radio network:

A. Contractor must supply a sequence of events for the installation of the new network showing any effect the different stages of installation may have on existing systems and their operation/reliability. Any relocation or modification to existing equipment must be stipulated and prior approval obtained from the City/County's Project Representative.

B. Proposers shall provide a completion period (in days) for the project, based on the City/County's execution of a Notice to Proceed. Proposers shall provide a schematic representation of the implementation process as well as a hypothetical migration plan. These required proposal submittals will be used by the City/County's designee and Consultant to evaluate the Proposer's ability and understanding of Specification requirements to perform this work in a manner that offers no disruption to ongoing public safety communication operations.

The project plan should include a schedule which does not start the staging of any technical equipment until 70% of the site designs are in the final stages of construction.

C. Contractor shall participate in progress review meetings, whose schedule shall be allied with the intensity of implementation activities. During actual on-site construction, progress review meetings will be conducted frequently and not less than on a bi-weekly basis. The

Contractor shall be responsible for updating and correcting the Project Time Line in response to the actions taken at each progress review meeting such that Contractor's and the City/County's work task responsibilities, and the dates for task completion, are clearly delineated.

D. Contractor shall provide a time schedule for the training of system managers, dispatchers, user personnel and maintenance staff. Contractor will supply time schedules for the orderly transfer of departments onto the new network and the estimated period when the transfer could be completed.

13.1.2 Contractor shall coordinate the orderly transfer of services to the new network only after having successfully concluded equipment alignment and installation procedures, successful completion of the network acceptance test and completion of manager, dispatcher, user and maintenance staff training programs.

13.1.3 Contractor must not dismantle or modify the existing radio system(s) without prior approval of the City/County's Project Representative. Decommissioning of the existing radio system after P25 radio network acceptance is the responsibility of the Contractor. The act of Contractor decommissioning shall require the de-installation and removal of surplus radio and microwave infrastructure, power supplies, antenna systems and transmission lines as well as the removal of mobile and portable radio equipment. An inventory submittal of decommissioned equipment asset numbers and serial numbers is required. With respect to legacy system interoperability, the City/County's Project Representative will notify the Contractor when elements of the existing radio system infrastructure equipment are to be reallocated to meet interoperability needs.

13.1.4 Contractor shall assist the City/County and its user agencies in preparing user talk groups, initial priority levels and shall complete the necessary user

equipment installation, programming and documentation, as required for project completion. This activity must be completed prior to network cutover.

13.1.5 Prior to Contract execution, the Successful Proposer must commence negotiations with the City/County's Project Representative and its Consultant to develop a comprehensive test and acceptance plan that addresses, minimally, the following major functionality and operability issues:

A. Transmitter Equipment

1. Provide RF power stage measurements at different levels of the transmitter system such as transmitter, filters, combiner, cable, antenna, etc.;

2. Test R.F. components for specified insertion loss (i.e., antenna sweeps and filter loss measurement);

3. Test for proper frequency programming, modulation format, digital signaling and call transaction stability;

4. Test and report of delivered audio quality and signal margins throughout proposed service area, in all required configurations (portable in-vehicle, portable on-street, portable in-buildings, etc.).

B. Receiver Equipment

1. Test of compliance to specifications of equipment provided;

2. Provide log of signal gain or loss to equipment within the receiver system such as antenna, cable, preamp, splitter, or receiver antenna port;

3. Test of audio quality and level (reciprocal of that required for the transmit path) of talk-in/talk-out balance;

C. Network Functionality & Reliability

1. Test of compliance to manufacturer's published specifications of equipment provided;

2. Test of on-air audio quality and clarity (inclusive of simulcast overlap regions);

3. Verification of network failure modes in response to forced failures of individual portions of the radio network, inclusive of the fixed LAN/WAN architecture supporting the various IP elements of the P25 digital radio network;

4. Verification of compliance to EIA/TIA Project-25 ISSI Standards that allow for seamless interoperability with Project-25 radio networks fielded by other manufacturers;

5. Verification of stability and run time of DC power systems and backup AC power systems;

6. Verification of stability and functional reliability of the microwave backhaul system inclusive of BER testing, mean receive signal level per site/path direction, and backhaul performance during simulated propagation conditions up to the fade margin limits specified by this RFP;

7. Successful completion of a 30-day infrastructure reliability "burn in" test of the radio network and microwave backhaul fixed-facility infrastructure.

D. Dispatch Centers

1. Provide written results of testing of radio dispatch console operational features per each console/facility location;

2. Verify the proper configuration and functionality of backup radio control stations associated with each radio console position.

E. Subscriber Equipment

Contractor shall perform a random field test of ten (10%) percent of each type or model of portable radio device provided by the Contract. Failed radios are to repaired or replaced as necessary. If more than ten (10%) percent of a type or model of equipment tested fails to meet the manufacturer's specifications, then the Contractor shall be required to perform a test of one hundred (100%) percent of that type or model and to replace or repair all failed radios. All mobile radio installations shall require 100% operational test verifications:

1. Verify compliance with vendor specifications for transmitter, receiver and control circuitry;

2. Check for compliance with RFP requirements and originally proposed functionality;

3. Check for proper user profile programming of equipment and operation on the network;

4. Testing of supportive equipment, i.e., speaker/microphone, battery chargers, batteries etc.

F. Contractor shall provide all test equipment, diagnostic services, documentation, software, personnel, vehicles and other items as

necessary to test the delivered and installed radio network in accordance with the Contract's Test and Acceptance Plan.

G. Proposer shall disclose test procedures and equipment that will be used to verify radio system coverage as specified in RFP Section 7.0.

H. Proposers shall submit within their Proposal Submittal a sample test and acceptance plan that is representative of the scope and complexity of the proposed radio system. This plan must address those items described in Section 13.1.5, A – G.

## 13.2 Implementation

13.2.1 Contractor is responsible for the provisioning and cost of warehousing, insurance, storage and security of radio network infrastructure and user equipment prior to and during the construction and installation phases of the project. **Nothing is to be factory staged or shipped to the City/County without customer approval.**

13.2.2 Contractor will assign a Project Manager as a single point of contact between the City/County's Project Representative and the Consultant. Contractor's Project Manager shall be approved by the City/County or designee prior to assignment. The City/County reserves the right to require replacement of the Contractor's Project Manager or its Sub-Contractors at any time during the project should those party's specific workmanship fall below Industry-accepted levels and/or where mandatory project submittals are deficient, are of poor quality or are materially delayed. Once on-site construction commences, after the City/County's approval of Contract-required construction documentation, the Contractor's Project Manager must be resident in the metropolitan area. Monday through Friday during normal business hours, for that period inclusive of the project's user migration onto the new radio network.

13.2.3 Prior to installation of any portion of the radio network by the Contractor, the City/County must approve Contractor-furnished engineering drawings as specified in Section 12.0.

13.2.4 Each portion of the new network must be in compliance with those technical parameters specified in the approved Testing and Acceptance plan.

13.2.5 Contractor must supply comprehensive training on user operation of portable radios, mobile radios, control stations, and other user equipment as required by the Contract. Contractor must also supply comprehensive training for

system diagnostics, management systems, preventative and routine maintenance and system operation for System Managers and City/County staff.

13.2.6 Contractor is responsible for site modifications required to accommodate infrastructure equipment proposed for location in City/County-owned as well as in non-City/County-owned properties.

13.2.7 Contractor shall provide technical support/engineering as required to modify existing FCC licenses or to acquire additional licenses required to facilitate operation of the proposed digital radio network. This activity shall include all FCC licensing application development, frequency coordination, engineering fees, and coordination fees.

13.2.8 Any modification or relocation of existing equipment will require prior approval by the City/County's Project Representative. Contractor shall supply "as built" drawings and complete written documentation of modifications or relocations to existing systems to facilitate maintenance of this City/County-owned equipment in the future.

# 14.0 WARRANTY AND MAINTENANCE GUIDELINES

## 14.1 Warranty

### 14.1.1 Equipment Warranty

The Successful Proposer/Contractor shall warrant all provided network equipment furnished as part of the Contract (i.e., associated radio infrastructure and related software) for a period of one year, after the date of system acceptance. The Contractor's warranty for user equipment supplied by this Contract shall be for two years. Contractor's warranty for battery packs shall be no less than one year.

Warranty for infrastructure, user equipment and accessories will commence at the time of final acceptance. Contractor shall provide for all labor and parts necessary for maintenance and repair, including preventive maintenance, of the network and equipment provided. All costs incurred due to its performance of the warranty obligation will be borne by the Contractor.

The City/County desires each Proposer to submit a cost proposal for an extended, long term (5-, 10- and 15-years) maintenance agreement for the network's infrastructure and all equipment to include tower, shelter, and power systems provided by the Proposer. This agreement shall include detailed defined preventative maintenance services as well as a demand service/after-hours response component. The proposed long term maintenance plan must be specific, where the scope and quantity of preventive maintenance inspections is disclosed; the response time for repair services is defined; what specific services are included within the maintenance plan; as well as which services are excluded but are available at added cost.

The City/County may elect to accept or deny this additional-cost maintenance agreement.

With respect to the initial warranty period, he following conditions shall apply:

A. Replacement parts must be of new or current manufacture and meet or exceed the specifications of the original supplied equipment (OEM).

B. Contractor shall have qualified technicians available on-site in response to a reported service outage within one hour during normal working hours (8AM to 5PM Monday through Friday; and within two hours between the hours of 5PM and 8AM, weekends and holidays. Contractor shall have a fully qualified, staffed and equipped service facility available during both the initial warranty and extended maintenance agreement periods.

**Response default penalties**:

In the event of default on the response time for reported service outages, the Contractor agrees to pay the City/County the following response penalties: Contractor shall pay $250 for each occasion that its fails to meet the response time obligation for a reported infrastructure service outage. Contractor shall pay $500 per twenty-four hour period in which defective infrastructure site equipment is not restored to operational status.

Should any specific equipment item (such as a specific portable radio, repeater station, station circuit board, power amplifier, etc.) fail three times during the warranty period, Contractor will replace that equipment item and warranty the replacement component for one additional year from the time of replacement.

C. The Contractor must make available replacement parts for all Contractor-manufactured components of the P25 digital radio infrastructure for 15 years following acceptance. Post-warranty replacement parts service for infrastructure equipment shall be available within 24-hours of parts order replacement. Failure to provide parts for contractor-manufactured items shall result in a 5% cost reduction penalty for each day parts are delayed, capped to a maximum 100% cost reduction.

Proposers shall provide, as part of Infrastructure Pricing, a list of quantities and costs for recommended spares and specific diagnostic, test and repair equipment of Infrastructure and major system components, including antennas and cabling. This list should be based on the best knowledge and experience of the Proposer's engineering, manufacturing and service personnel. This price submittal shall be in compliance with the requirements indicated by Section 16, Pricing. If there is a potential extended term discount available to the City/County should it purchase the recommended spare parts inventory, that discount structure must be disclosed so that the offer can be appropriately evaluated? Recommended spare parts should be provided for all technical systems provided under this proposal.

D. The Contractor must guarantee the radio network's operating software, inclusive of user equipment software, for a one-year period following network acceptance. The Contractor shall provide and install software updates for the entire period under which the City/County has committed for Contractor-provided after warranty maintenance services. If software updates are likely to require a hardware equipment refreshment, the cost of that hardware element(s) shall have been considered and included by the Successful Proposer/Contractor within the long-term maintenance services plan.

The Contractor further guarantees that it has good title to any material and software supplied to the City/County and that it will defend the City/County from any third-party claims concerning such material or software

## 14.2 Maintenance

14.2.1 During the initial warranty period, the Contractor shall be responsible for:

A. Preventive maintenance of all infrastructure provided in this proposal and end-user equipment.

B. Repair maintenance of all infrastructure equipment provided in this proposal, inclusive of antenna systems.

C. Repair maintenance of subscriber and related user equipment.

D. Installation of repaired mobile-mounted radio equipment should removal of such equipment be required as part of the equipment's maintenance.

14.2.2 Contractor-provided maintenance during the warranty period will be monitored by the City/County or its designated representative.

The Contractor must supply monthly service logs listing the site(s) where service is performed, the equipment involved, and delineation of repair service details. Failure of individual equipment units, sub-assemblies and/or components must be reported in writing to the City/County. This report must, as a minimum, include unit identification (i.e., equipment description and serial number), explanation and cause of failure and corrective action taken.

The Contractor shall submit a maintenance work plan that identifies the tasks required in accordance with Section 14.2.1, a listing of Contractor supplied

personnel and identification of a single 24/7/365 contact point responsible for Contractor maintenance issues. All required service logs and repair reports must be submitted to the City/County or its designated technical representative.

## 15.0 RADIO PROGRAMMING AND SPARE PARTS REQUIREMENTS

### 15.1 Radio Programming

15.1.1 Contractor shall assist the City/County's designee, City/County staff and various user agencies in determining user identification and talk path assignments. Contractor shall share fleet/agency/group configuration suggestions and shall provide the necessary programming software and use-case training from which the City/County can develop programming templates for its various user agencies. Contractor shall review and critique the City/County's programming templates as a means of process control and to ensure that correct combinations of radio programming and feature selections have been completed prior to actual programming of user radios.

15.1.2 Contractor shall program all portable, mobile and control station radios, all network or site controllers and all other equipment supplied by the Contractor to operate on the FCC-licensed operating frequencies and the talk paths determined in Section 15.1.1, above.

15.1.3 Contractor shall prepare and furnish to the City/County's Project Representative "as programmed" records for each radio (infrastructure & subscriber) placed on the system. These records shall also document the versions of firmware/feature codes installed in user radios as well as the various radio infrastructure elements.

15.1.4 Contractor shall provide training for System Managers and Communication's staff sufficient to permit the System Managers and Communication's staff to

add users, create new or modify talkgroup and user priority levels, conduct software-driven maintenance processes, and to access all other network software controlled features.

15.1.5 Provisions shall be incorporated into the system to allow the Contractor, from its Home Office to remotely interrogate the network's operating system, P25 core server, switches/routers, radio and microwave alarm systems, and to provide other software assistance if requested by the City/County's designee or System Manager or Communication's staff. Network access for this purpose, must be secure via appropriate firewalls and under the control of the City/County's Project Manager.

15.1.6 Contractor must provide to the City/County no less than four sets of radio and equipment programming software, appropriately configured laptop computers, and all other support equipment and special cables necessary to program each type of user and infrastructure equipment/device supplied by the Contractor.

**15.2 Spare Parts**

15.2.1 Contractor must maintain an initial City/County approved stock of spare parts through the designated warranty period at no cost to the City/County, as determined necessary, to maintain all components of the network's infrastructure for the duration of the Contract's specified warranty period. These spare parts shall be located either at selected the City/County's radio infrastructure sites, Communications or at the Contractor's local-area Maintenance Service Station facility

15.2.2 As spare parts are consumed during the course of routine or repair maintenance, the Contractor shall immediately replenish its stock of locally housed spare parts, where necessary. Any spare parts shortage should immediately be increased at no cost to the customer during the initial warranty period and extended warranty/service period determined by the

City/County. A report of the utilization frequency and rate of consumption for spare materials shall be made available to City/County staff. If at any time the Contractor is aware of any equipment repair or recall notifications, the Contractor shall notify the City/County by electronic and routine mail. Trends of unusual network or component failure shall be brought to the attention of the City/County or their designee by the Contractor.

15.2.3 The contractor will provide a cost for non-warranty repair or depot level repair activities for the period of contract.

15.2.4 The contractor will provide the costs to replace any/all proposed batteries at a two-year interval period (or that period recommended by the battery manufacturer) as an optional cost.

## 16.0 PRICING CONSIDERATIONS

### 16.1 General Pricing Information

This infrastructure and subscriber equipment-pricing portion of this Specification is developed as a guide for Proposers so that the necessary information is provided to the City/County, their designee and Consultant for it to conduct an accurate assessment of proposed cost. This information is illustrative of the detail required for each infrastructure site, inclusive of sites having only dispatch-related equipment. As this is a turnkey system, any pricing omission of a scope that is normally considered part of a P25 trunked radio network or configuration thereof will be provided for by the Contractor at no additional cost to the City/County.

Subscriber equipment (mobiles, portables and accessories) is intended to be purchased as part of this Specification. Some or all user equipment purchases and quantities ordered may be delayed or not ordered depending on the City/County financing options and capabilities. The pricing of this equipment for both initial and future purchases will be considered in determining the most advantageous price.

The City/County reserves the right to choose a turnkey solution, including infrastructure and subscribers or a variation of any turnkey compliant proposer.

The City/County retains the right to perform life-cycle analysis in determining the best price-value. One important component of such as analysis involves knowledge of the life cycle of the various major equipment elements making up a Proposer's solution. The production age of equipment families, and the platform as a whole, affects the downstream ability to source spare parts and software support and is a key factor in determining the operational life of a technology or product.

Proposers shall disclose as part of their Pricing Proposal when base stations, network controllers, P25 interface gateways, user equipment families and the operational software for the technology was first released for sale to the Public. Proposers shall also provide a life-cycle roadmap, referenced by year and so depicts when each of those proposed product elements is likely to be discontinued and when parts/software support will cease to be available.

In the case of manufacturers of low-tier Project-25 compliant subscriber (user) equipment devices desiring to offer such equipment for consideration, the City/County welcomes such participation. This procurement; however, is structured for the purchase of both infrastructure and user equipment from a turnkey provider. Therefore, manufacturers of Project-25 compliant subscriber equipment shall have entered formal sales/service agreements with established P25 Phase 1 and Phase 2 infrastructure providers for their equipment to be considered for this procurement. Furthermore, such third-party equipment shall be proposed only by those providers offering a responsive infrastructure proposal. All user equipment supplied must be CAP-certified for operation on Project-25 compliant radio infrastructures.

## 16.2 Site Modification Costs

### 16.2.1 City/County-Owned Sites

For equipment to be installed at City/County-owned sites which have requirements for site preparatory work involving architectural, mechanical, electrical, civil or structural construction modifications, a description and cost of the modifications required must be provided by the Proposer for each individual named site.

### 16. 2.2 Rental Sites

For equipment installed at rental sites which have requirements for site work involving architectural, mechanical, electrical, civil or structural modifications to meet the functional requirements stated herein, the Contractor shall be responsible for all work. It is the Proposer's responsibility to ensure that the selected site can be modified for the equipment selected to occupy that site.

The Proposer shall also provide the annual operating costs of any proposed rental site, inclusive of space rental, antenna placement rental and utilities. Additionally, the Proposer shall provide a letter for the Rental Site Owner that confirms the availability of the necessary space to accommodate the proposed facilities and that such space has been reserved for the full duration of the Proposal Evaluation and Contract Award Period.

### 16.3 Maintenance Costs

It is the intention of the City/County to use outside contract labor for maintaining its infrastructure equipment and subscriber equipment.

An annual maintenance cost for each infrastructure-related site, to become effective after expiration of the initial warranty period, must be provided (refer to Section 14 for warranty/maintenance requirements). Total site maintenance costs are to be subdivided by each site. All site (backbone infrastructure) maintenance costs should be totaled.

### 16.4 Pricing Summaries

Pricing Summaries for Infrastructure and Subscriber equipment shall be provided as part of the Proposal Submittal. Pricing Summaries will be based on:

Infrastructure Equipment
Project Management, Engineering, & Installation Services
Subscribers
Subscriber Programming and Installation Services
Infrastructure Discount
Subscriber Discount
Turnkey Discount
System Maintenance
Subscriber Maintenance
Total Cost of Ownership at 5, 10, & 15 years
Optional Requests

All summary information will be supported by detailed cost information as detailed further in this Section.

### 16.5 Future Purchase Considerations

It is the intent of the City/County to operate this new radio communications network for, minimally, the next fifteen years. As some portions of the equipment purchased may only be available from one vendor, it is important that City/County receive reasonable safeguards regarding future pricing

#### 16.5.1 Immediate Future Discounts

The City/County requires within the Proposal a certainty of continued purchase at the beneficial initial-contract costs of all equipment, components, parts, materials, software and service agreements for a minimum of 5 years.

For all purchases within five (5) years after the network acceptance date, the discount percentage received by the City/County will be identical to the discount percentages derived from list-price unit equipment costs and proposed unit costs. The Proposer shall define the discount structure for radio infrastructure, subscriber equipment.

### 16.5.2 Purchase Price Discount Years 6 - 10

For years six (6) through ten (10) after the network acceptance date, the City/County's discount from the manufacturer's published equipment list price, as delivered to their authorized sales agents, shall be as follows:

| | |
|---|---|
| Fixed Site Equipment | _____% |
| Microwave Related Equipment | _____% |
| Console Equipment | _____% |
| Control Station Equipment | _____% |
| Subscriber Equipment | _____% |
| Accessories | _____% |
| Spare Parts | _____% |

### 16.5.3 Price Discount Years 11 - 15

For years eleven (11) through fifteen (15) after the network's acceptance date, the City/County's discount from the manufacturer's published equipment list price as delivered to their authorized sales agents, shall be as follows:

| | |
|---|---|
| Fixed Site Equipment | _____% |
| Microwave Related Equipment | _____% |
| Console Equipment | _____% |
| Control Station Equipment | _____% |
| Subscriber Equipment | _____% |
| Accessories | _____% |
| Spare Parts | _____% |

## 16.6 Infrastructure Pricing Analysis Worksheets

The following pricing worksheets are to be used as a guide to developing the Infrastructure Price Submittal. These worksheets are indicative of the detail required and may be amended or expanded as necessary. Proposers shall develop and submit individual pricing sheets for each infrastructure site, inclusive of dispatch site locations, for their Price Proposal to be considered responsive. Any omission or error in developing the pricing proposal, as per Section 1.16 of this Specification, shall be the sole responsibility of the Proposer (Contractor).

## 16.7 Pricing Models

All vendors can price their submitted proposals based on any or all of the following three (3) models for consideration by the City/County.

All models will contain very specific detail on how each can be provided and the responsibilities of the Contractor and the City/County for each model.

1. City/County Owned and Operated

The infrastructure and subscribers will be purchased and owned by the City/County. The City/County will manage the operation and insource or outsource maintenance, at its discretion.

2. Public/Private Partnership

The infrastructure and subscribers will be leased and operated by the City/County. The Contractor will build and maintain per these detailed specifications for a fixed period described by the Contractor. The network will be owned by the City/County at the end of the described period.

3. Service Based

The infrastructure, subscribers, and maintenance will be provided by the Contractor under these detailed specifications for a fixed period described by the Contractor. The system will be owned by the Contractor at the end of the described period.

**Simulcast System**

**Core/Simulcast Control Point #1:**

| Equipment Description | Number Req'd | List Unit Cost | RFP Unit Cost | Extended Cost | Maintenance Cost |
|---|---|---|---|---|---|
| Network Controller | 1 | $_____ | $_____ | $_____ | $_____ |
| Console/Audio Gateway | _____ | $_____ | $_____ | $_____ | $_____ |
| Simulcast Sync. Eq. | Lot | $_____ | $_____ | $_____ | $_____ |
| WAN/LAN Equipment | Lot | $_____ | $_____ | $_____ | $_____ |
| Receiver Voter/Selector | Lot | $_____ | $_____ | $_____ | $_____ |
| Interop Gateway Equipment | Lot | $_____ | $_____ | $_____ | $_____ |
| System/Alarm Manager Computers | 1 | $_____ | $_____ | $_____ | $_____ |
| Microwave Link Equipment | 1 | $_____ | $_____ | $_____ | $_____ |
| Standby Battery Plant System | 1 | $_____ | $_____ | $_____ | $_____ |
| Emergency Generator System | 1 | $_____ | $_____ | $_____ | $_____ |
| Site Engineering | 1 | $_____ | $_____ | $_____ | $_____ |
| Project Management | 1 | $_____ | $_____ | $_____ | $_____ |
| Equipment Installation | Lot | $_____ | $_____ | $_____ | $_____ |

| | |
|---|---|
| Subtotal Equipment | $_____ |
| Subtotal Labor | $_____ |
| Total Equipment/Labor | $_____ |
| Total Annual Maintenance Cost. | $_____ |

**Simulcast System**

**Redundant Core/Simulcast Control Point #2:**

| **Equipment Description** | Number **Req'd** | List Unit **Cost** | Bid Unit **Cost** | Extended **Cost** | Maintenance **Cost** |
|---|---|---|---|---|---|
| Network Controller | 1 | $_____ | $_____ | $_____ | $_____ |
| Console/Audio Gateway | _____ | $_____ | $_____ | $_____ | $_____ |
| Simulcast Sync. Eq. | Lot | $_____ | $_____ | $_____ | $_____ |
| WAN/LAN Equipment | Lot | $_____ | $_____ | $_____ | $_____ |
| Receiver Voter/Selector | Lot | $_____ | $_____ | $_____ | $_____ |
| Interop Gateway Equipment | Lot | $_____ | $_____ | $_____ | $_____ |
| System/Alarm Monitor Computers | 1 | $_____ | $_____ | $_____ | $_____ |
| Microwave Link Equipment | 1 | $_____ | $_____ | $_____ | $_____ |
| Standby Battery Plant System | 1 | $_____ | $_____ | $_____ | $_____ |
| Emergency Generator System | 1 | $_____ | $_____ | $_____ | $_____ |
| Site Engineering | 1 | $_____ | $_____ | $_____ | $_____ |
| Project Management | 1 | $_____ | $_____ | $_____ | $_____ |
| Equipment Installation | Lot | $_____ | $_____ | $_____ | $_____ |

| | |
|---|---|
| Subtotal Equipment | $_____ |
| Subtotal Labor | $_____ |
| Total Equipment/Labor | $_____ |
| Total Annual Maintenance Cost. | $_____ |

**Simulcast System**

**Transmit/Receiver Site # ____:**

| **Equipment Description** | Number **Req'd** | List Unit **Cost** | Bid Unit **Cost** | Extended **Cost** | Maintenance **Cost** |
|---|---|---|---|---|---|
| Transmitters | 10 | $_____ | $_____ | $_____ | $_____ |
| *Transmitter Antenna Systems* | _____ | *$_____* | *$_____* | *$_____* | *$_____* |
| Combiner Package(s) | _____ | $_____ | $_____ | $_____ | $_____ |
| Receiver Antenna | _____ | $_____ | $_____ | $_____ | $_____ |
| Tower-top Preamp | _____ | $_____ | $_____ | $_____ | $_____ |
| Multicoupler | _____ | $_____ | $_____ | $_____ | $_____ |
| Receivers | 10 | $_____ | $_____ | $_____ | $_____ |
| 800 MHz Interop Links | 5 | $_____ | $_____ | $_____ | $_____ |
| VHF Interop Links | 4 | $_____ | $_____ | $_____ | $_____ |
| UHF Interop Links | 4 | $_____ | $_____ | $_____ | $_____ |
| Protected Microwave System | Lot | $_____ | $_____ | $_____ | $_____ |
| Microwave Antenna System | Lot | $_____ | $_____ | $_____ | $_____ |
| LAN/WAN Equipment | 1 | $_____ | $_____ | $_____ | $_____ |
| Standby Generator System | 1 | $_____ | $_____ | $_____ | $_____ |
| Battery/Charger System | 1 | $_____ | $_____ | $_____ | $_____ |
| M/W Installation | Lot | $_____ | $_____ | $_____ | $_____ |
| Site-Civils Modifications | Lot | $_____ | $_____ | $_____ | $_____ |
| Equipment Shelter | 1 | $_____ | $_____ | $_____ | $_____ |
| Tower | 1 | $_____ | $_____ | $_____ | $_____ |
| Infrastructure Installation | 1 | $_____ | $_____ | $_____ | $_____ |
| Tower Installation | 1 | $_____ | $_____ | $_____ | $_____ |
| Shelter Installation | 1 | $_____ | $_____ | $_____ | $_____ |
| Project Management | Lot | $_____ | $_____ | $_____ | $_____ |
| System Engineering | Lot | $_____ | $_____ | $_____ | $_____ |

| | |
|---|---|
| Subtotal Equipment | $_____ |
| Subtotal Labor | $_____ |
| Total Equipment/Labor | $_____ |
| Total Annual Maintenance Cost. | $_____ |

**Tornado Siren System**

| | Number | List Unit | Bid Unit | Extended | Maintenance |
|---|---|---|---|---|---|
| **Equipment Description** | **Req'd** | **Cost** | **Cost** | **Cost** | **Cost** |
| Transmitters | 1 | $_____ | $_____ | $_____ | $_____ |
| *Transmitter Antenna Systems* | *1* | *$_____* | *$_____* | *$_____* | *$_____* |
| Mobiles | 20 | $_____ | $_____ | $_____ | $_____ |

| | |
|---|---|
| Subtotal Equipment | $_____ |
| Subtotal Labor | $_____ |
| Total Equipment/Labor | $_____ |
| Total Annual Maintenance Cost. | $_____ |

## 16.8 Subscriber Equipment Pricing

The City/County envisions several tiers of portable and mobile radio units for use by the various public safety and non-public safety agencies. Those non-public safety users having minimal interoperability needs may benefit from lower-tiered, less costly radios having smaller talk group capacities and a limited list of feature options. Public Safety agencies, however, may require highest-tier devices capable of voice encryption, telephone interconnect calling, private call, GPS location, status messaging and other specialized features.

Proposers shall develop cost proposals for low, mid and high-tier radio products using the following general format and having, minimally, the following capabilities:

<u>High-Tier Portable</u>

1. At least 800 modes/talk groups/channels
2. 700/800MHz operation; Phase 1 and 2
3. Multi-line alpha-numeric LCD text display
4. Radio/ Network status icons
5. 9-button keypad
6. Private/Individual Call
7. AES voice encryption
8. IMBE/AMBE+ vocoders
9. Emergency Button
10. Programmable option buttons
11. Talk group scan
12. System Scan
13. Intrinsically Safe
14. Integrated voice/data capability
15. Wide range of optional accessories
16. Two (2) Batterie

Mid-Tier Portable

1. At least 400 modes/ talk groups/ channels
2. 700/800MHz operation; Phase 1 and 2
3. Multi-line alpha-numeric LCD text display
4. Radio/Network status icons
5. 3-button keypad
6. Private/Individual Call
7. AES voice encryption
8. IMBE/AMBE+ vocoders
9. Emergency Button
10. Programmable option buttons
11. Talk group scan
12. System Scan
13. Intrinsically Safe
14. Integrated voice/data capability
15. Wide range of optional accessories
16. Two (2) Batteries

Low-Tier Portable

1. At least 120 modes/talk groups/channels
2. 700/800MHz operation; Phase 1 and 2
3. Single-line alpha-numeric LCD text display
4. Radio/Network status icons
5. No keypad
6. IMBE vocoder
7. Emergency Button
8. Programmable option buttons
9. Intrinsically Safe
10. Limited list of optional accessories
11. Two (2) Batteries

High-Tier Mobile Radio

1. At least 800 modes/talk groups/channels
2. 700/800MHz operation; Phase 1 and 2
3. Remote Control Head/ Rear Mount Configuration
4. Multi-line alpha-numeric LCD text display
5. Radio/Network status icons
6. 9-button keypad
7. Private/Individual Call
8. AES voice encryption
9. IMBE/AMBE+ vocoders; Phase 1 and 2
10. Emergency Button
11. Programmable option buttons
12. Talk group scan
13. System Scan
14. Integrated voice/data capability
15. Wide range of optional accessories

Mid-Tier Mobile Radio

1. At least 400 modes/talk groups/channels
2. 700/800MHz operation; Phase 1 and 2
3. Remote Control Head/ Rear Mount Configuration
4. Multi-line alpha-numeric LCD text display
5. Radio/Network status icons
6. 9-button keypad
7. Private/Individual Call
8. AES voice encryption
9. IMBE/AMBE+ vocoders; Phase 1 and 2
10. Emergency Button
11. Programmable option buttons
12. Talk group scan
13. System Scan
14. Integrated voice/data capability
15. Wide range of optional accessories

Low-Tier Mobile Radio

1. 700/800MHz Operation; Phase 1 and 2
2. Front-Mount Package
3. At least 120 modes/talk groups/channels
4. Two-Line alphanumeric display
5. Network/Radio Icons
6. IMBE vocoder
7. Programmable option buttons
8. Emergency Button
9. Limited range of optional accessories

Additionally, Proposers shall prepare a detailed optional equipment catalog that describes the full range of options available for all Tiers and indicated portable and mobile radio configurations. The submitted catalog shall include list prices and the proposed discount percentage-reduced initial purchase price.

### *16.9 Subscriber Minimum Configurations*

**Sheriff/PD**

| Minimum Features |
|---|
| AES Encryption |
| Multi-key |
| OTAR |
| GPS(Portable Only) |
| Call Paging/Alert |
| High Tier |

| **Portables** |
|---|
| Full keypad |
| individual charger |
| speaker mic (no antenna) |
| ear piece |
| belt clip |
| 2 wire undercover kit |
| duty case/holster |
| 2 batteries |
| Optional no keypad (model 2/scan) |

## Fire/EMS

| Minimum Features |
|---|
| GPS (Portable & Mobile) |
| Call Paging/Alert |
| Intriniscally Safe/UL Certified |
| Man Down |
| OTAR |
| AES Encryption |
| Multi-key |
| Color Options |
| High Tier |

| **Portables** |
|---|
| no key pad (model 2/scan) |
| Large Knobs |
| individual charger |
| Speaker Mic |
| belt clip |
| duty case/holster |
| Optional vehicle charger |
| 2 batteries |

## Emergency Management

| Minimum Features |
|---|
| AES Encryption |
| Multi-key |
| OTAR |
| GPS (Portable Only) |
| Call Paging/Alert |
| High Tier |

| **Portables** |
|---|
| Full key pad |
| individual charger |
| speaker mic (no antenna) |
| ear piece |
| belt clip |
| duty case/holster |
| 2 batteries |

## Non-Public Safety

| Minimum Features |
|---|
| GPS (Mobile Only) |
| Call Paging/Alert |
| Low Tier |

| **Portables** |
|---|
| individual charger |
| 2 batteries |

### *16.10 Console Furniture Pricing*

Proposers shall provide pricing for the 911 Center as part of the turnkey requirements in this proposal. Optional pricing for the console furniture shall be provided for the Emergency Management/Backup Dispatch Center.

**The subscriber list for the City/County and other is:**

| Georgetown/Scott County, Kentucky Countywide Public Safety Communications System Subscriber Radio Equipment | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Georgetown | | | County | | | | Stamping Ground | | | |
| | | Total | Police | Fire | Public Works | Fire | EM | Sheriff | Roads | Police | EMS | Coroner | Detention |
| **Mobile** | | | | | | | | | | | | | |
| Remote Mount P25 Police | Qty. | 147 | 70 | | | | 14 | 50 | | 4 | | 2 | 7 |
| | | | | | | | | | | | | | |
| Dash Mount P25 Fire/EMS | Qty. | 75 | | 20 | | 31 | | | | | 24 | | |
| | | | | | | | | | | | | | |
| Dash Mount P25 City | Qty. | 80 | | | 50 | | | | 30 | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Portable** | | | | | | | | | | | | | |
| Portable P25 Police/EMS | Qty. | 262 | 80 | | | | 32 | 50 | | 4 | 50 | 6 | 40 |
| | | | | | | | | | | | | | |
| Portable P25 Fire | Qty. | 160 | | 66 | | 94 | | | | | | | |
| | | | | | | | | | | | | | |
| Non-Public Safety P25 | Qty. | 20 | | | 10 | | | | 10 | | | | |
| | | | | | | | | | | | | | |
| Carrying Case/Belt Clip | Qty. | 442 | 80 | 66 | 10 | 94 | 32 | 50 | 10 | 4 | 50 | 6 | 40 |
| | | | | | | | | | | | | | |
| Desk Charger | Qty. | 399 | 80 | 66 | 10 | 94 | 32 | 50 | 10 | 4 | 37 | 6 | 10 |
| | | | | | | | | | | | | | |
| Multi-Unit Charger | Qty. | 40 | 5 | 7 | 1 | 8 | 3 | 5 | 1 | 1 | 4 | 0 | 5 |
| | | | | | | | | | | | | | |
| Speaker Mic/Ear Piece | Qty. | 442 | 80 | 66 | 10 | 94 | 32 | 50 | 10 | 4 | 50 | 6 | 40 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Control Station (non-dispatch)** | | | | | | | | | | | | | |
| Control Station | Qty. | 29 | 1 | 3 | 4 | 6 | 1 | 4 | 1 | 1 | 6 | 1 | 1 |
| | | | | | | | | | | | | | |
| Antenna System | Qty. | 29 | 1 | 3 | 4 | 6 | 1 | 4 | 1 | 1 | 6 | 1 | 1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

## 16.9 Proposal Authorization Form

**(To be submitted with each Price Proposal)**

I (or we) do hereby declare that I (or we) have carefully examined this RFP Specification and the annexed Addenda numbered _____, and I (or we) have a clear understanding of said Specifications, and shall provide the required communications equipment and the necessary permits and authorizations, tools, machinery, apparatus, and other means of construction, and to furnish all labor, materials, and services specified in the Contract or called for in the said Specifications (including all taxes/fees) necessary for the completion of the work described herein.

Respectfully submitted,

By:

| | |
|---|---|
| _____ | _____ |
| Authorized Signature | Title |
| _____ | _____ |
| Business Name | Business Address |
| _____ | _____ |
| Telephone Number | Date |

# APPENDIX A

# APPENDIX A

GENERAL COMPLIANCE

NOTE TO PROPOSERS: Proposal submission does not constitute an agreement or a contract with the City of Georgetown.

PROPOSAL SUBMISSION: ANY PROPOSALS NOT RECEIVED PRIOR TO THE SCHEDULED OPENING DATE AND TIME MAY BE REJECTED.

FAILURE TO SUBMIT REQUIRED DOCUMENTATION: Failure to submit ALL forms and information required in this RFP may be grounds for disqualification.

KENTUCKY OPEN RECORDS LAW: At the time a proposal is submitted to the City, proposer shall identify any information that is submitted as part of the proposal that is proprietary or confidential in nature and not subject to release for public inspection. The City of Georgetown will protect any proprietary or confidential information to the extent allowable under the Kentucky Open Records Act.

COMPLIANCE WITH LAWS AND REGULATIONS: Each proposer shall comply with all Federal, State & Local regulations concerning this type of service.

METHOD OF AWARD: The City of Georgetown reserves the right to reject any and all proposals, to award any proposal in whole or in part, and/or to waive any irregularities or minor immaterial defects in any and all proposals. The right is also reserved to award proposals based on the best interest and/or most advantageous to the City. The City of Georgetown may also consider any alternative proposal that meets its basic needs.

PRICING: All prices shall be quoted exclusive of any taxes. The City of Georgetown is exempt from Federal excise, transportation and/or Kentucky sales tax. Any items supplied directly to the City from a supplier/manufacturer are exempt from sales tax. Any items purchased by a contractor that will be used in the fulfillment of a contract are not exempt from sales tax.

STANDARD AGREEMENT: The selected Proposer will be required to sign a Standard Agreement for Goods and Services with the City within fourteen (14) days of the Notice of Award. The agreement will contain terms and conditions that include duration of the agreement, sworn statement regarding campaign finance laws, a provision indicating that the proposer and its employees or agents are not employees of the City, a termination clause, an additional termination clause of those agreements covering multiple fiscal years in the event that sufficient funds are not appropriated as part of the budget process, provision that Kentucky law applies to interpretation of the agreement and any disputes and that venue shall be Scott County, KY, and a provision that the services cannot be assigned without the prior approval of the City.

A Notice to Proceed will be issued once the agreement has been signed by both parties and all required paperwork herein described is received by the City.

PAYMENT: The proposal must clearly state the payment terms, including prompt payment discounts and payment due dates. Discounts should be figured into the unit price of the quoted item. The City of Georgetown reserves the right to select the most beneficial terms.

DEFAULT; TERMINATION OF CONTRACT: In the event that any of the provisions of this Contract are violated by the proposer, such breach shall constitute a default. In the event of a default, the Owner may serve written notice upon the proposer of its intention to terminate the Contract, such notice to contain the reasons for such intention to terminate the Contract, and unless within ten (10) days after the serving of such notice upon the proposer, such violation or delay shall cease and satisfactory arrangement of correction be made, the Contract shall, upon the expiration of said ten (10) days, cease and terminate.

The City shall be authorized to terminate for its own convenience all contracts for the procurement of supplies and services when the Department Head determines in writing that such termination will be in the best interest of the City.

SAFETY: The successful proposer must perform work in a safe and timely fashion, maintain a clean and safe work environment, follow safety requirements established by OSHA and the City of Georgetown, and may be required to provide safety equipment. If, in the opinion of the City, safety precautions are not in existence, work will cease immediately until corrective action is taken. Work will begin again only when vendor demonstrates to the satisfaction of the City that conditions are without risk.

HOLD HARMLESS AGREEMENT: The proposer covenants to save, defend, keep harmless, and indemnify the City of Georgetown and all of its officers, departments, agencies, agents, and employees from and against all claims, loss, damage, injury, fine, penalties, and costs including court costs and attorney's fees, charges, liability, and exposure however caused resulting from, arising out of, or in any way connected with the proposer's negligent performance or non-performance of the terms of the contract.
CONTRACTOR STATUS: Proposer understands and agrees that its employees, agents, or sub-proposers are not employees of the City of Georgetown for any purpose whatsoever.

PROPOSER'S QUALIFICATIONS: Proposer must demonstrate to the satisfaction of the City of Georgetown that he/she has adequate equipment, personnel, experience and understanding of the specifications to perform service under the contract.

No contract will be awarded to any proposer who, in the opinion of the City, is not qualified to perform satisfactorily due to a previously unfavorable performance, reputation or lack of experience, capital, organization, equipment, and/or personnel to conduct and complete the services in accordance with the terms and conditions of the contract.

Successful proposer must comply with the City of Georgetown ordinances relating to Occupational License Fees, Business Licenses, payroll and net profits and any other ordinances which may apply to any particular proposal package.

PROPOSER PREFERENCE: Pursuant to KRS 45A.494, which is incorporated herein by reference: “a resident Proposer of the Commonwealth shall be given a preference against a nonresident Proposer registered in any state that gives or requires a preference to Proposers from that state. The preference shall be equal to the preference given or required by the state of the nonresident Proposer. “

EQUAL OPPORTUNITY STATUTES: The City of Georgetown is an equal opportunity employer and does not discriminate on the basis of race, color, religion, sex, national origin, age, marital status, physical or mental disability, or any other characteristic protected by law. The City is also committed to employing only United States citizens and aliens who are authorized to work in the United States. The City complies with the Immigration Reform and Control Act of 1986. Therefore, the successful proposer must demonstrate to the satisfaction of the City that he also conforms to all Federal, State, and Local Equal Opportunity statutes. Further, the contractor will reimburse the City of Georgetown for any damages incurred due to any violation of the above-mentioned statutes by the contractor while under contract to the City.

AMBIGUITY, CONFLICT OR OTHER ERRORS IN RFP: If a proposer discovers any ambiguity, conflict, discrepancy, omission or other such error in the RFP, he/she shall immediately notify the City of Georgetown of such error in writing and request modification or clarification of the document if allowable by the City of Georgetown.

# AFFIDAVIT

Comes the Affiant, _____, and after being first duly sworn under penalty of perjury as follows:

1. His/her name is _____ and he/she is the individual or the authorized representative of _____ (hereinafter referred to as "Proposer"), and is authorized to submit the Proposal Response Form, equal opportunity agreement and Vendor's Statement Pursuant to KRS 45A.343 attached hereto and incorporated herein by reference.
2. Proposer will pay all taxes and fees, which are owed to the City of Georgetown at the time the proposal is submitted, prior to award of the contract and will maintain a "current" status in regard to those taxes and fees during the life of the contract.
3. Proposer will obtain a City of Georgetown business license, if applicable, prior to award of the contract.
4. Proposer authorizes the City of Georgetown to verify the above-mentioned information with the Division of Revenue and to disclose that taxes and/or fees are delinquent or that a business license has not been obtained.
5. Proposer has not knowingly violated any provision of the campaign finance laws of the Commonwealth of Kentucky within the past five (5) years and the award of a contract to the Proposer will not violate any provision of the campaign finance laws of the Commonwealth.
6. Proposer has not knowingly violated any provision of Chapter 2 of the City of Georgetown Code of Ordinances, known as "Ethics Act."
7. Proposer acknowledges that "knowingly" for purposes of this Affidavit means, with respect to conduct or circumstances described by a statute or ordinance defining an offense, that a person is aware or should have been aware that his conduct is of that nature or that the circumstance exists.

Further, Affiant sayeth naught.

_____
Affiant

STATE OF _____

CITY/COUNTY OF _____

The foregoing instrument was subscribed, sworn to and acknowledged before me by _____ on this the _____ day of _____, 2017.

My Commission expires: _____

_____
NOTARY PUBLIC, STATE AT LARGE

# EQUAL OPPORTUNITY AGREEMENT

The Law

- Title VII of the Civil Rights Act of 1964 (amended 1972) states that it is unlawful for an employer to discriminate in employment because of race, color, religion, sex, age (40-70 years) or national origin.
- Executive Order No. 11246 on Nondiscrimination under Federal contract prohibits employment discrimination by vendor and sub-vendor doing business with the Federal Government or recipients of Federal funds. This order was later amended by Executive Order No. 11375 to prohibit discrimination on the basis of sex.
- Section 503 of the Rehabilitation Act of 1973 states:

  The Vendor will not discriminate against any employee or applicant for employment because of physical or mental handicap.
- Section 2012 of the Vietnam Era Veterans Readjustment Act of 1973 requires Affirmative Action on behalf of disabled veterans and veterans of the Vietnam Era by vendors having Federal contracts.
- Section 206(A) of Executive Order 12086, Consolidation of Contract Compliance Functions for Equal Employment Opportunity, states:

  The Secretary of Labor may investigate the employment practices of any Government vendor or sub-vendor to determine whether or not the contractual provisions specified in Section 202 of this order have been violated.

**********

The City of Georgetown practices Equal Opportunity in recruiting, hiring and promoting. It is the Government's intent to affirmatively provide employment opportunities for those individuals who have previously not been allowed to enter into the mainstream of society. In following this commitment to Equal Employment Opportunity and because the Government is the benefactor of the Federal funds, it is both against the Government policy and illegal for the Government to let contracts to companies which knowingly or unknowingly practice discrimination in their employment practices. Violation of the above mentioned ordinances may cause a contract to be canceled and the vendors may be declared ineligible for future consideration.

Please sign this statement in the appropriate space acknowledging that you have read and understand the provisions contained herein. Return this document as part of your application packet.

Proposers

I/We agree to comply with the Civil Rights Laws listed above that govern employment rights of minorities, women, Vietnam veterans, handicapped and aged persons.

Signature _____ Name of Firm _____

# VENDOR'S STATEMENT PURSUANT TO KRS 45A.343

45A.343 Local Public Agency may adopt provisions of KRS 45A.345 to 45A.460 – Effect of Adoption – Contracts are required to mandate revealing of violations of and compliance with specified KRS chapters – Effect of nondisclosure or noncompliance. (KRS 136 – Corporate taxes; KRS 139 – Sales & use taxes; KRS 141 – Income taxes; KRS 337 – Wage and hour; KRS 338 – Occupational safety; KRS 341 – Unemployment; KRS 342 – Workers Comp.)

The undersigned, as a duly authorized officer of _____ pursuant to KRS 45A.343 states;

1. To the best of my knowledge, information and belief, _____ has not been finally determined to have violated any of the provisions of KRS Chapters 136, 139, 141, 337, 338, 341, or 342 that apply to it within the five year period preceding this statement.

2. _____ acknowledges that it will be required to be in compliance with those provisions of KRS Chapters 136, 139, 141, 337, 338, 341, and 342 that apply to it for the duration of the Contract to be entered into with the City of Georgetown, Kentucky.

3. _____ acknowledges that if it fails to reveal any final determination of violation of KRS Chapters 136, 139, 141, 337, 338, 341, or 342, or to comply with the applicable provisions of those statutes for the duration of the aforesaid Contract, such shall be grounds for The City of Georgetown, Kentucky to:

a) Cancel its contract with _____, and

b) Disqualify _____ from eligibility for future contracts awarded by The City of Georgetown for a period of two years.

This the_____day of _____, 2017.

Firm: _____

By: _____

Title: _____

# APPENDIX B

# CRITICAL BUILDINGS
# GEORGETOWN/SCOTT COUNTY, KENTUCKY

- Toyota Motor Manufacturing of Kentucky (All Buildings)
  1001 Cherry Blossom Way Georgetown, KY

- Krogers Marketplace
  106 Marketplace Circle Georgetown, KY

- Georgetown Community Hospital
  1140 Lexington Road Georgetown, KY

- Wal-Mart
  112 Osborne Way Georgetown, KY

- Scott County High School
  1080 Cardinal Drive Georgetown, KY

- Harmony Christian Church
  170 Southgate Drive Georgetown, KY

- Knight Hall (Georgetown College)
  315 East College Street Georgetown, KY

- Pho Kappa Tau House (Georgetown College)
  400 East College Street Georgetown, KY

- Georgetown EMS HQ & City Fire Station 1
  141 South Broadway Georgetown, KY

- Scott County Fire Station 1/Scott County Emergency Management
  2200 Cincinnati Pike Georgetown, KY

- Scott County Fire Station 5
  Homestead Parkway Georgetown, KY

- Stamping Ground Elementary School
  3233 Main Street Stamping Ground, KY

- Northern Elementary
  3600 Cincinnati Pike Georgetown, KY

- Eastern Elementary School
  3407 Newtown Pike Georgetown, KY

- Georgetown/Scott County Airport
  6206 Paris Pike Georgetown, KY

- Grace Christian Church
  1648 Lexington Road Georgetown, KY

- Scott County Detention Center (Requires 100% coverage)
  130 North Court Street Georgetown, KY

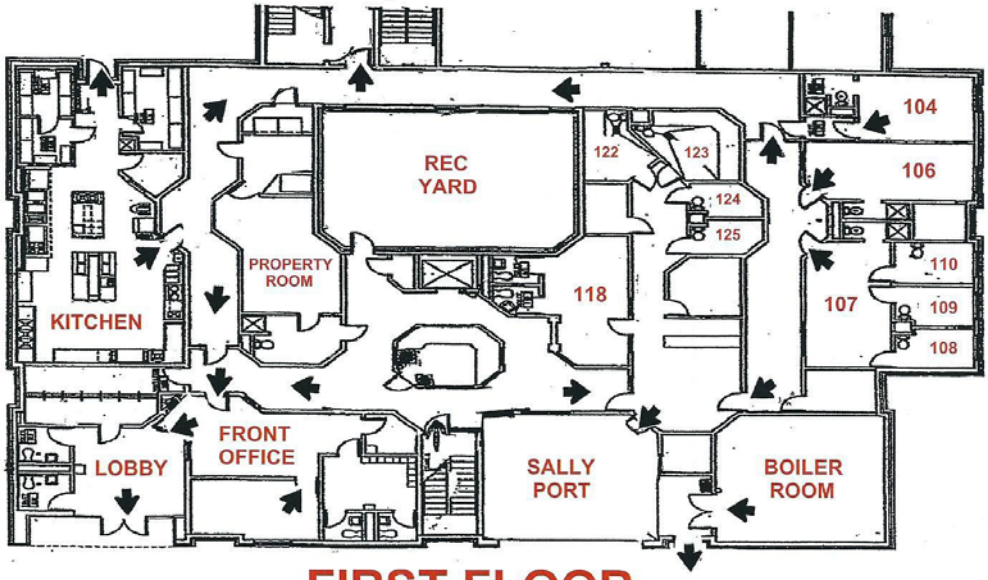
- Kohls
  112 Magnolia Drive Georgetown, KY

- Lowes
  109 Magnolia Drive Georgetown, KY

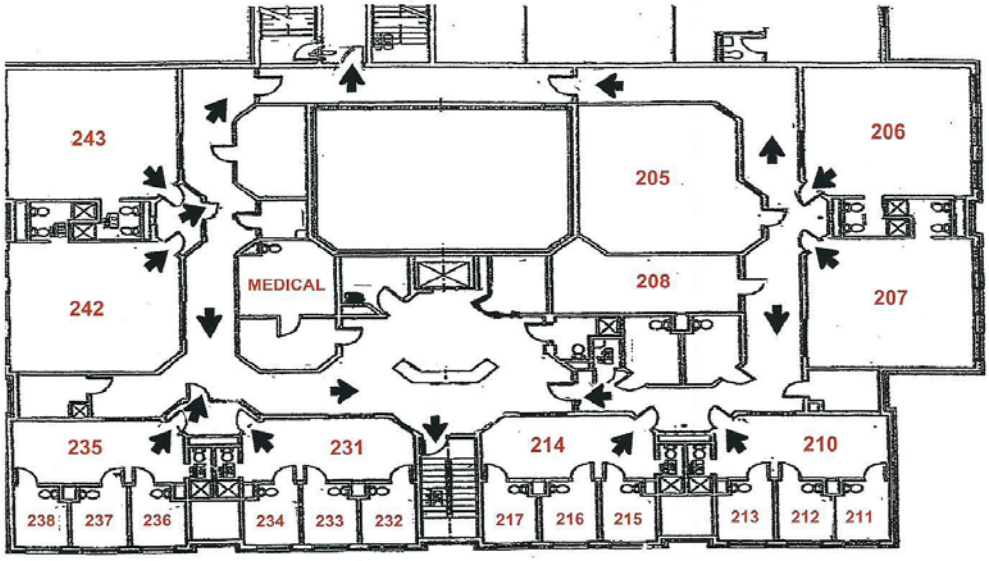
- Georgetown College Student Center
  400 East College Street Georgetown, KY

- Georgetown Police Department (current BDA installed)
  550 Bourbon St, Georgetown, KY

# Appendix C



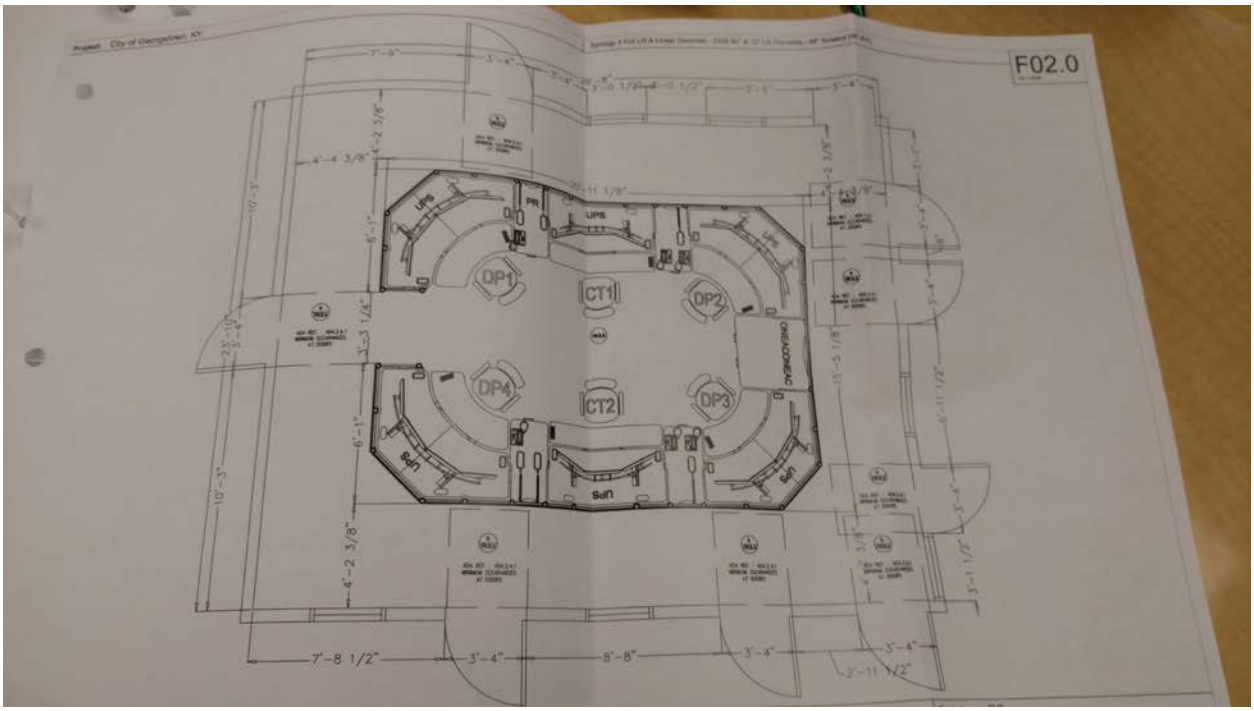

FIRST FLOOR




SECOND FLOOR

**Scott County Detention Facility**

# APPENDIX D




**911 Dispatch Center Furniture Layout**